TOSHIBA

SERVICE MANUAL

COLOUR TELEVISION

28YT56/32YT56

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DVB-T MODUL SERVICE MANUAL

Document History

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1. Introduction

1.1. Purpose

This document is prepared for the UOC3 TV project and describes the whole system features and operating principles to be used in hardware design phase.

The document is based on "Device Specification UOCIII-Version 2.5" and "Introducing UOC-III" from **Philips Semiconductors**.

1.2. Scope

The document covers detailed descriptions of AK49 chassis system building blocks.

1.3. General Features

AK49 is a 110° / 50 Hz. chassis which is capable of driving CRT sizes in the range of 24" – 33", including realflat and 16:9 CRT's . The chassis has the following main features;

- Remote Control
- Colour Standards ; PAL, SECAM, NTSC,
- Transmission standards ; B/G, L/L' I/I', DK,
- Teletex ; 10 pages,
- Intercarier/QSS sound proccessing,
- Multi-standard alignment free PLL tuning,
- PIP, PAP, POP, PAT, TAT ,
- CTI option ,
- 2D Comb Filter ,2D/4H
- Headphone with volume control,
- SubWoofer option,
- 2 Full Scart with SVHS availability via Scart-2 , Scart-3 / BAV, FAV and F_SVHS /B_SVHS,
- BSVM option,
- Dynamic Focus option,
- Rotation (Tilt) option,
- NICAM/GERMAN Stereo,
- Virtual Dolby option,
- 2 x 10W (%10 THD),
- YPbPr input feature,
- TV-DVD Combi ,
- IDTV ,
- TV-R/HDD,
- EPG,

2. General Description

2.1. Introduction

This chapter describes system building blocks and their detailed discriptions.

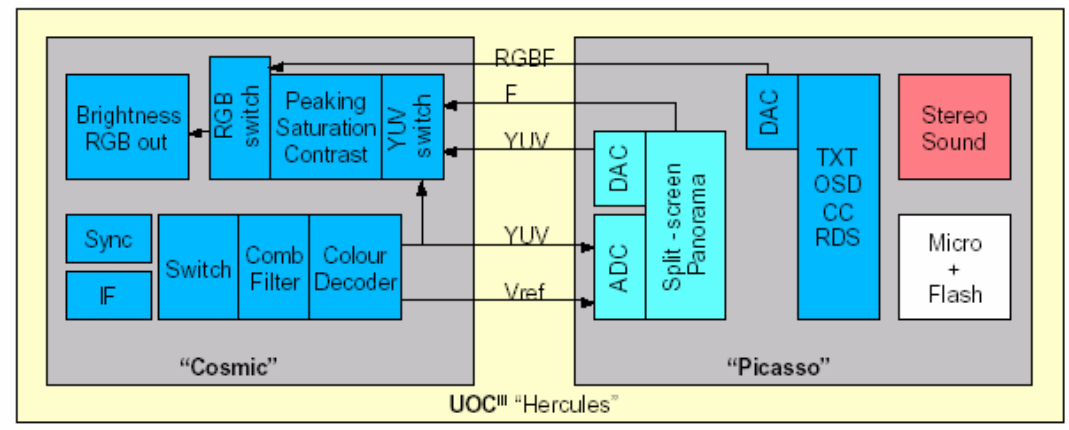
2.2. System Building Blocks

AK49 chassis main block are;

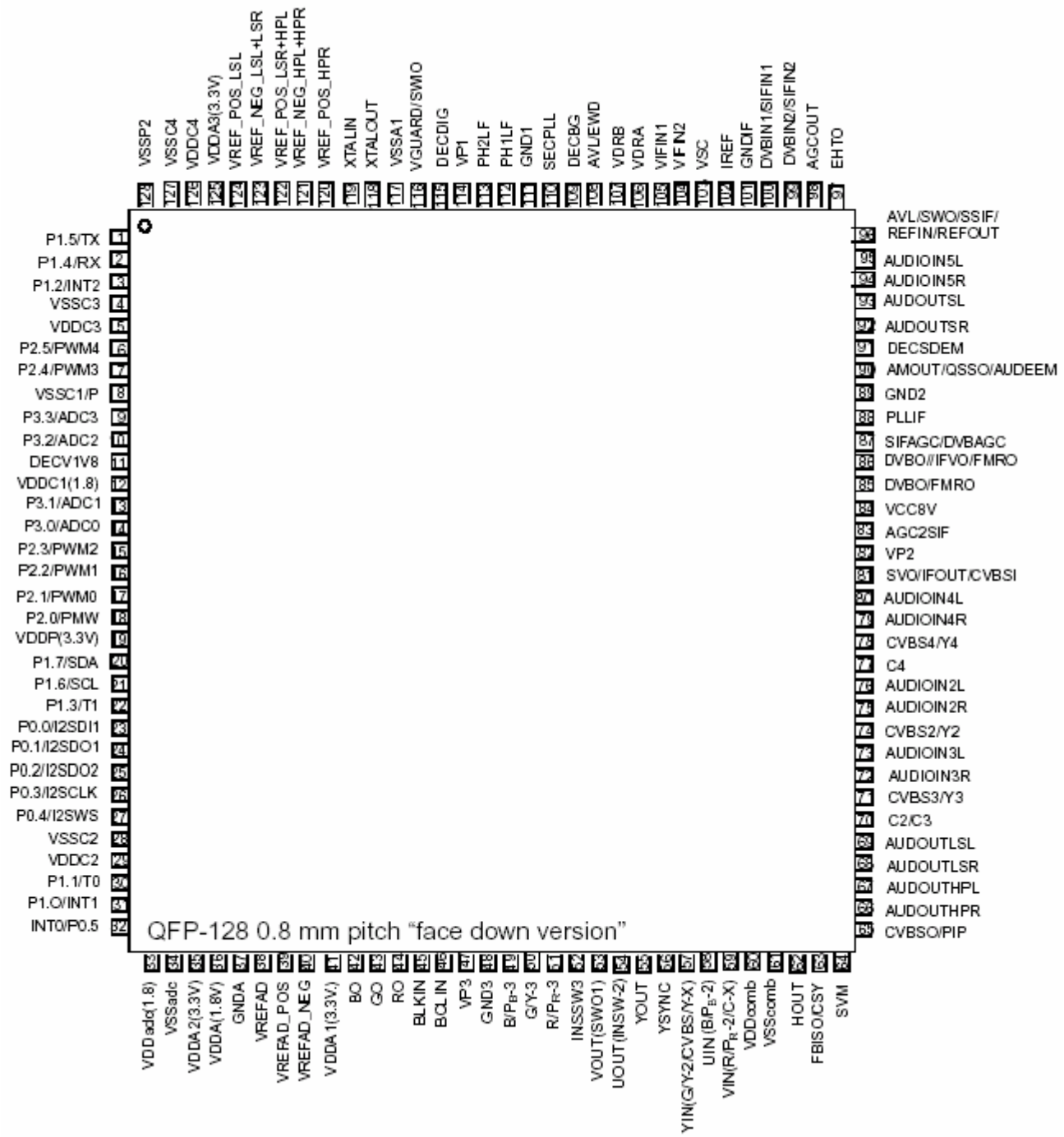
- **UOC3** : Microcontroller + Video Proccessor + Sound Proccessor + IF+Teletext
- **SMPS** : SMPS Controller, SMT, Bridge Rect., Line Filters
- **HV Block** : FBT, HOT, Vertical Amplifier, Line Driver, EW Amp.
- **AUDIO** : Audio Amp., DAC, Comperator.
- **CRT BOARD** : RGB Amp.
- **Feature Board** : PIP, CTI IC's.

2.2.2 UOC-III (ULTIMATE-ONE-CHIP)

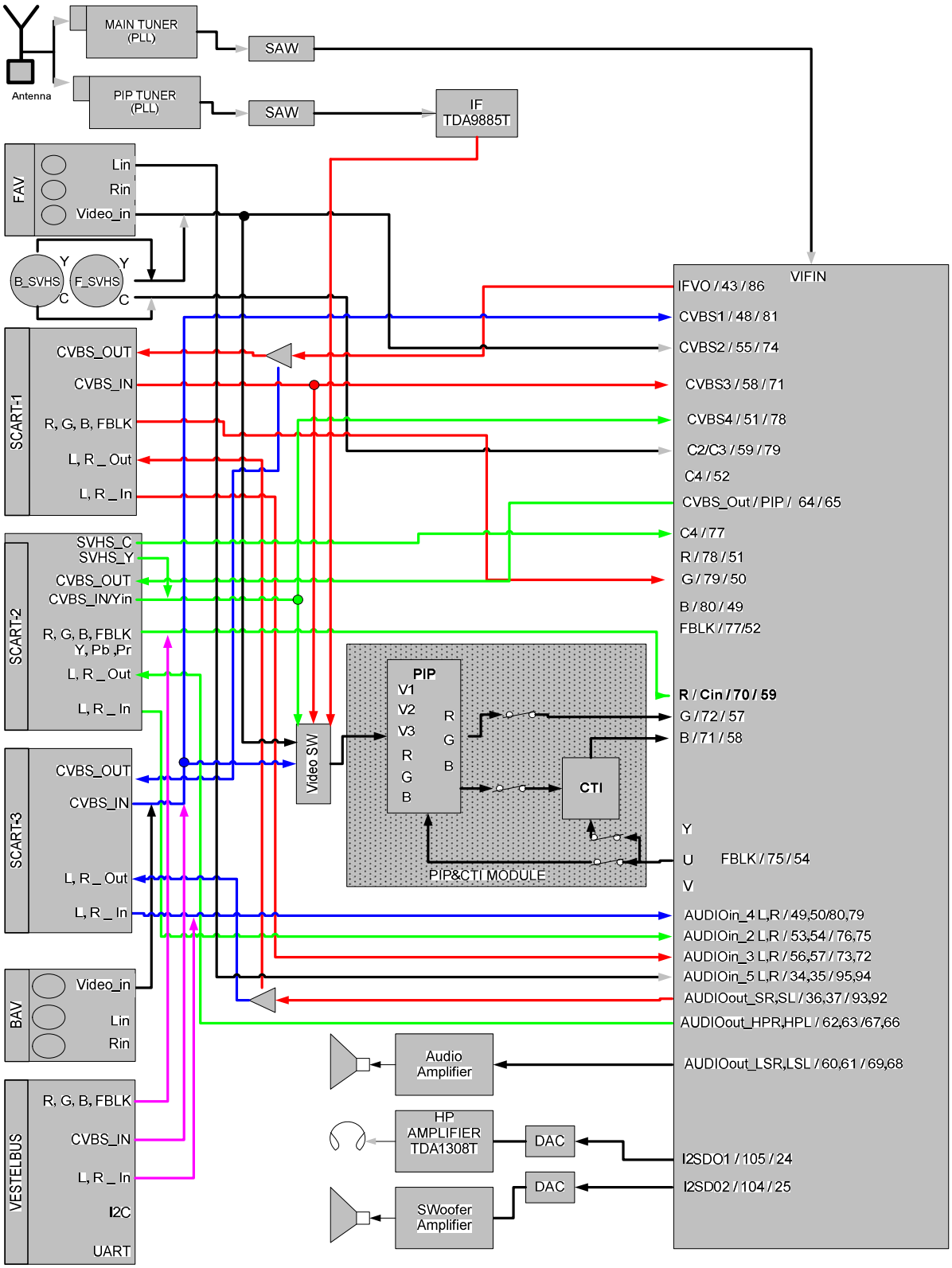
UOC3 is composed of microcontroller, video proccessor, sound proccessor and IF blocks. So, there are digital and anolog parts in it named as Picasso and Cosmic respectively as shown below ;



UOC3 has standard and face down versions, pin squence differs between two version. After investigation of the pining it is decided to use face down version for layout compability.



Block diagram of the TV System with face-down version is;


Antenna
MAIN TUNER (PLL)
PIP TUNER (PLL)
SAW
SAW
IF TDA9885T
FAV
Lin
Rin
Video_in
B_SVHS
F_SVHS
Y
C
SCART-1
CVBS_OUT
CVBS_IN
R, G, B, FBLK
L, R _ Out
L, R _ In
SCART-2
SVHS_C
SVHS_Y
CVBS_OUT
CVBS_IN/Yin
R, G, B, FBLK
Y, Pb ,Pr
L, R _ Out
L, R _ In
SCART-3
CVBS_OUT
CVBS_IN
L, R _ Out
L, R _ In
BAV
Video_in
Lin
Rin
VESTELBUS
R, G, B, FBLK
CVBS_IN
L, R _ In
I2C
UART
Video SW
PIP
V1
V2
V3
R
G
B
CTI
PIP&CTI MODULE
Audio Amplifier
HP AMPLIFIER TDA1308T
DAC
SWoofer Amplifier
DAC
VIFIN
IFVO / 43 / 86
CVBS1 / 48 / 81
CVBS2 / 55 / 74
CVBS3 / 58 / 71
CVBS4 / 51 / 78
C2/C3 / 59 / 79
C4 / 52
CVBS_Out / PIP / 64 / 65
C4 / 77
R / 78 / 51
G / 79 / 50
B / 80 / 49
FBLK / 77/52
R / Cin / 70 / 59
G / 72 / 57
B / 71 / 58
Y
U FBLK / 75 / 54
V
AUDIOin_4 L,R / 49,50/80,79
AUDIOin_2 L,R / 53,54 / 76,75
AUDIOin_3 L,R / 56,57 / 73,72
AUDIOin_5 L,R / 34,35 / 95,94
AUDIOout_SR,SL / 36,37 / 93,92
AUDIOout_HPR,HPL / 62,63 /67,66
AUDIOout_LSR,LSL / 60,61 / 69,68
I2SDO1 / 105 / 24
I2SD02 / 104 / 25

2.2.2.1 FAV & BAV & B_SVHS & F_SVHS

B_SVHS and F_SVHS inputs can not be supported at the same time.

FAV & B_SVHS_Y & F_SVHS_Y inputs use same CVBS input. (cvbs2/74)
B_SVHS_ C & F_SVHS_C input is C2/C3(70).

FAV audio input is AUDIOin_5 L,R (94,95) and shared with F_SVHS.

BAV video input is CVBS1 (81) and can not be supported with SCART3 at the same time.

BAV audio input is AUDIOin_4 L,R (80,79) and shared with SCART3.

2.2.2.2 SCART1

SCART1 video input is (CVBS3/71) . SCART1 video input is also applied to Video Switch IC(TEA6415C) for PIP application.

SCART1 video out will use (IFVO/86) front_end video output, that output is also used as SCART3 video output via a buffer circuit.

SCART1 RGB/fblk inputs are R(51), G(50), B(49), FBLK(52) .

SCART1 AUDIO input is AUDIOin_3 L,R (73,72) .

SCART1 AUDIO output is AUDIOout_SR,SL (93,92). Same output also used as SCART3 Audio output.

2.2.2.3 SCART2

SCART2 video input is CVBS4 (78) . SCART2 video input is also applied to Video Switch IC(TEA6415C) for PIP application.

SCART2 supports SVHS input. SVHS / C input is C4 (77) , Y input is use same video input.

SCART2 video output is CVBSO/PIP (65). That video output is selectable, all inputs can be selected to be output from SCART2.

SCART2 RGB inputs are R(59), G(57), B(58), FBLK/INSSW2 (54), except CTI/PIP option.

At PIP application ;

- There are PIP_CVBS, SCART1, SACRT2, SCART3, FAV video inputs and RGB, FBLK inputs to PIP IC.

- If there is no CTI application, PIP output is applied to SCART2 RGB input directly.

- In case of PIP&CTI combined application, PIP output will be input to CTI IC as YUV. The YUV output of CTI IC will be applied to R/Vin(59), G/Yin(57), B/Uin(58) as YUV.

YPbPr input is possible via SCART2 RGB lines with an adaptor.
In this case R/Vin(59), G/Yin(57), B/Uin(58) inputs can be used as;
- RGB,
- YUV,
- YPbPr inputs.

SCART2 audio inputs are AUDIOin_2 L,R (75) .

SCART2 audio outputs are AUDIOout_HPR,HPL (67,66). That output is also selectable .

2.2.2.4 SCART3

SCART3 video input is CVBS1 (81) . That input will also be used as optional BAV video input. and applied to Video Switch IC(TEA6415C) for PIP application.

SCART3 video output will be SCART1 video output via a buffer circuit.

SCART3 audio inputs are AUDIOin_4 L,R (80,79). These audio inputs will also used for optional BAV L,R and VESTELBUS L,R audio inputs.

SCART3 audio out will be through SCART1 audio outputs via a buffer circuit.

2.2.2.5 VESTELBUS(IDTV,DVD-Combi)

VESTELBUS video input is CVBS1 (81), so VESTELBUS will not be supported with SCART3 at the same time.

VESTELBUS RGB inputs are SCART2 RGB inputs, so **in case of VESTELBUS option SCART2 RGB is not supported**.

VESTELBUS UART input ;

- TXD TX (1),
- RXD RX (2),
- IRQ_DVB INT2 (3).

VESTELBUS I2C input is standard I2C bus.

2.2.2.6 AUDIO

Main audio out is AUDIOout_LSR,LSL (69,68).
Selectable HP out is I2SD01 24) out to DAC.
Subwoofer out is I2SD02 (25) out to DAC.

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2.2.2.7 PORT ALLOCATIONS

(32)	(INT-0)	REMOTE
(31)	(INT-1)	TV_LINK
(30)	(Counter-Timer)	PROTECTION
(27)	(I2S Word Select)	I2S_WS
(26)	(I2S Clock)	I2S_CLK
(25)	(I2S OUT2)	I2S_Swoofer
(24)	(I2S OUT1)	I2S_HP
(23)	(I2S-IN/OUT)	WRITE-PROT.
(22)	(ON/OFF)	ON/OFF+LED
(21)	(SCL)	SCL
(20)	(SDA)	SDA
(18)	(PWM)	ROT/TILT
(17)	(PWM0)	PAP_LOW
(16)	(PWM1)	SW
(15)	(PWM2)	S_RESET
(14)	(ADC0)	AV1_STAT
(13)	(ADC1)	AV2_STAT
(10)	(ADC2)	AV3_STAT/DVD SENSE
(9)	(ADC3)	KEYB.+SERV.
(7)	(PWM3)	MUTE
(6)	(PWM4)	SAW_SW
(3)	(INT2)	IRQ/DVB
(2)	(UARTBUS)	RXD
(1)	(UART BUS)	TXD

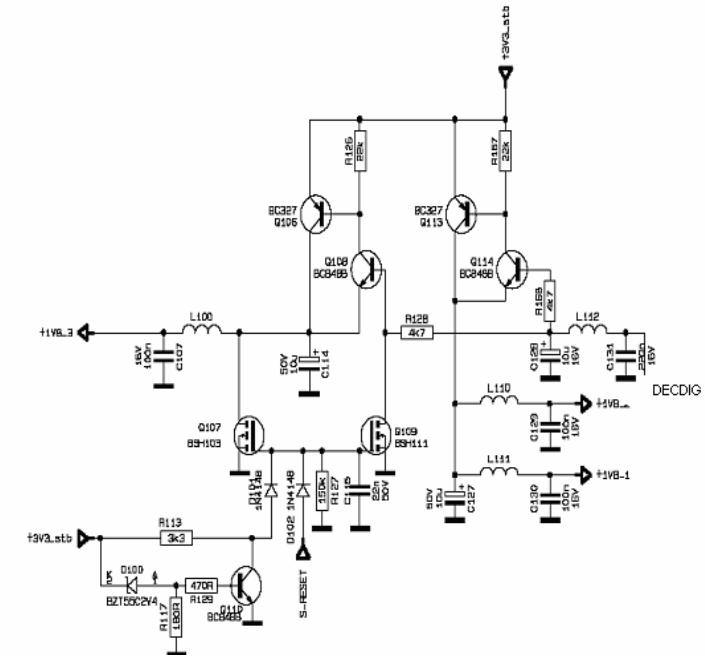
2.2.2.8 POWER MANAGEMENT

The power consumption of UOC3 is ;

Mode		+5V needed	+8V (+5V)	+3.3V Standby	DecDig 2.5V$_{OUT}$	+1.8V (extern)	H$_{OUT}$		TV part	Micro part	Remark
Application mode		190mA	2mA	100mA	on	280mA	STB=1	on	on	on	On = All functionality available
VCR		190mA	2mA	100mA		280mA	STB=0		tuner		VCR mode = Front-end still active Deflection off
transition		no	-	??mA		-	STB=0		off		µC **fully functional** (set OSD=off)
Standby	Sleep	no	-	40mA	off	-	STB=x	off	off coma	limited	µC-STDBY mode (Remote wake-up)
Idle				10mA						IDLE	µC-IDLE mode (using RCP)
Stop				??mA						Clock stop	µC-POWERDOWN mode Re-activate via INTerrupt or reset

Only 3,3V_Stb is necessary for the start-up. IC internally produces 2,5V and 1,8V at the Standby mode. After start-up necessary 1,8V are produced by external regulators. So, we have 3,3V_Stb, 5V, 5V_Stb and 1,8V. for UOC3. We don't have 8V. even for audio outputs (1,2V RMS achieved with 5V). All the voltages are produced by SMPS except 1,8V.

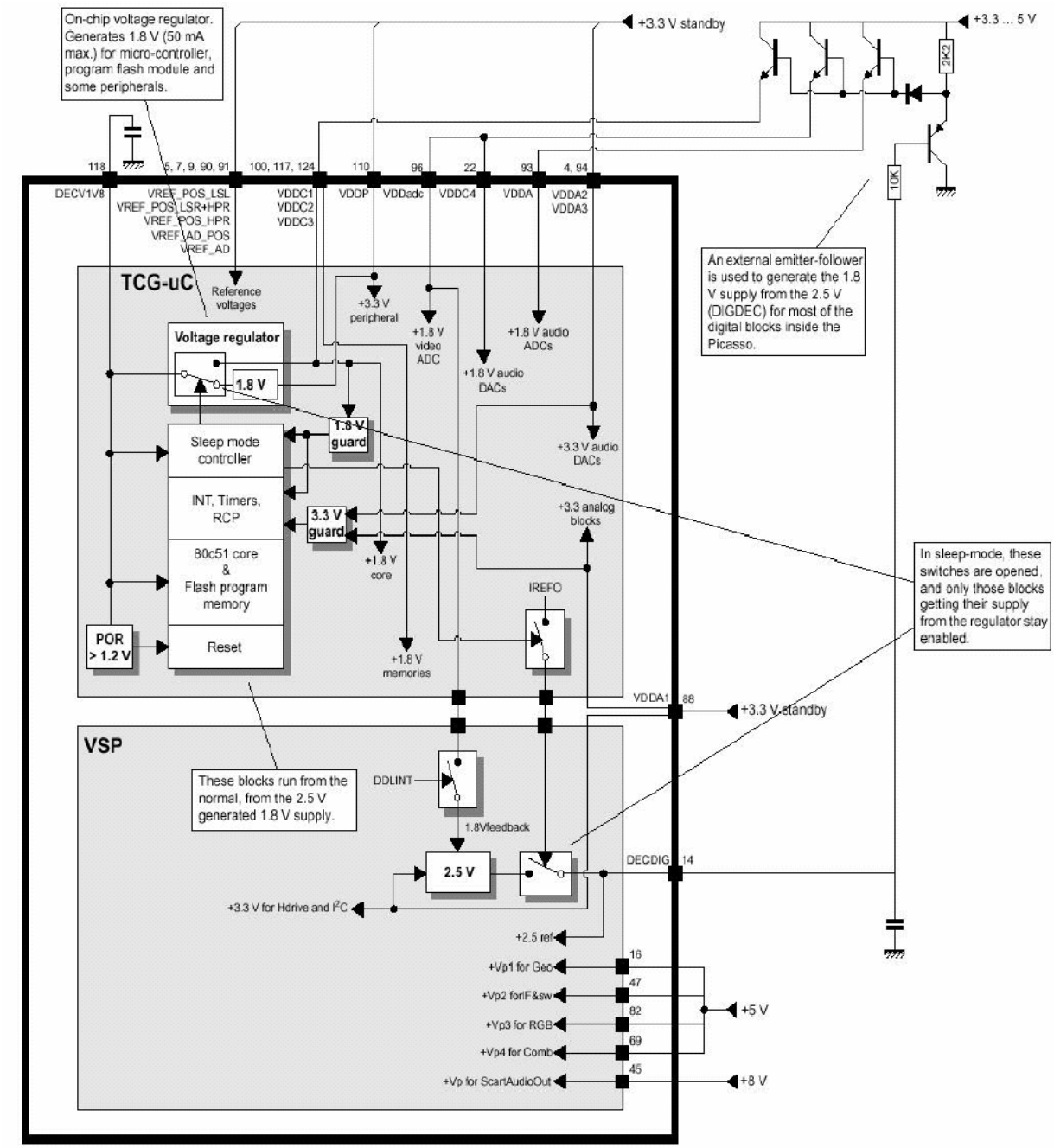
RESET :



1V8 digital and 1V8 analogue are produced by using 2V5 DECDIG-signal. DECDIG-signal is given

to base of Q108 Transistor and base of Q114 Transistor. The collector voltage becomes 1v8.
When the +3V3_stb voltage decreases below the 2V6 Q110 Transistor goes OFF condition so FETs become ON. Q107 FET shorts 1V8 digital to ground and system is reset condition.
Another reset condition becomes when the S_Reset port is active. While S_Reset port is active, FETs become ON. 1V8 digital is shorted to ground.

All the supply architecture of the UOC3 is as follows;



2.2.2.9 INPUT & OUTPUT PERFORMANCE

EXTERNAL INPUT - OUTPUT PERFORMANCE	
CVBS INPUT VOLTAGE	1 ± 0.15 V_{p_p}
CVBS OUTPUT VOLTAGE	Luminance 700 ± 15 % mV_{pp} Sync 300 ± 15 % mV_{pp} Burst 300 ± 15 % mV_{pp} DC level 2 V dc
VIDEO OUTPUT IMPEDANCE	75 ± 10 % Ω
RGB INPUT VOLTAGE	1 ± 15 % V_{p_p}
AUDIO INPUT VOLTAGE	500 ± 15 % Mv_{rms}
AUDIO OUTPUT VOLTAGE	500 ± 15 % mV_{rms}
AUDIO INPUT IMPEDANCE	minimum 10 KΩ
AUDIO OUTPUT IMPEDANCE	maximum 1 KΩ
PIN 8 SWITCHING	Standard
PRIORITY BETWEEN SCARTS	Vestel Standard

RECEPTION PERFORMANCE	
USABLE MINIMUM SIGNAL LEVEL	50 dBµV
USABLE MAXIMUM SIGNAL LEVEL	90 dBµV
COLOUR KILLER LEVEL	32 dBµV
SOUND KILLER LEVEL	30 dBµV
SYNCHRONISING SENSITIVITY LEVEL	35 dBµV
FM GERMAN STEREO SENSITIVITY LEVEL	40 dBµV
NICAM STEREO SENSITIVITY LEVEL	40 dBµV
BTSC STEREO SENSITIVITY LEVEL	NO BTSC
NOISE LIMITED SENSITIVITY LEVEL	30 dBµV
TELETEXT EYEHEIGHT LEVEL	% 45
CLOSED CAPTION SENSITIVITY LEVEL	NO CLOSED CAPTION
AFC PULL IN RANGE	-500 KHz / +800 KHz
TUNER RECEIVING RANGE	± 5 MHz

2.2.2.10 FEATURE BOARD (PIP & CTI)

PIP&PAP and CTI applications performed with that feature board. For PIP&PAP application Micronas SDA9488/SDA9489 and for CTI application Toshiba TA1366FG is used.

There is a socket on the board for external YUV input which will be used for DVD or IDTV application with PIP&PAP and CTI feature. There are switches on the board for adaptation of application configurations.

Only CTI Application

YUV output from UOC3 comes to CTI IC TA1366FG and goes back to UOC3 .

CTI & IDTV or DVD

CTI & PIP Application

YUV output from UOC3 comes to CTI IC TA1366FG , then inputs to PIP IC SDA9488. Any desired external CVBS signal is directed to PIP IC via video switch and used for PIP picture on CTI applied video signal. That video signal goes back to UOC3 as YUV.

2.2.3 AUDIO BLOCK

2.2.3.1 AUDIO AMPLIFIER

TDA8928J 2X10W class D amplifier is used for audio amplification. It is supplied by +14V and –14V to give 2X10W output to 8ohm. loads by %10 THD.

7 PINNING

SYMBOL	PIN	DESCRIPTION
SW1	1	digital switch input; channel 1
REL1	2	digital control output; channel 1
DIAG	3	digital open-drain output for overtemperature and overcurrent report
EN1	4	digital enable input; channel 1
V_{DD1}	5	positive power supply; channel 1
BOOT1	6	bootstrap capacitor; channel 1
OUT1	7	PWM output; channel 1
V_{SS1}	8	negative power supply; channel 1
STAB	9	decoupling internal stabilizer for logic supply
V_{SS2}	10	negative power supply; channel 2
OUT2	11	PWM output; channel 2
BOOT2	12	bootstrap capacitor; channel 2
V_{DD2}	13	positive power supply; channel 2
EN2	14	digital enable input; channel 2
POWERUP	15	enable input for switching on internal reference sources
REL2	16	digital control output; channel 2
SW2	17	digital switch input; channel 2

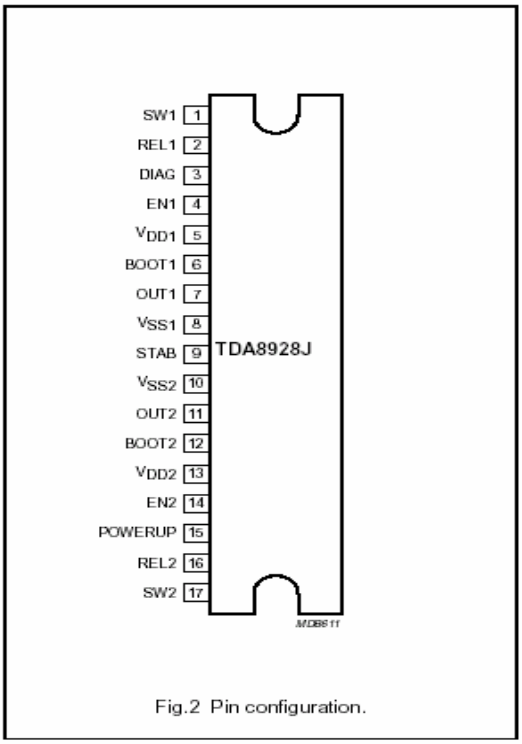
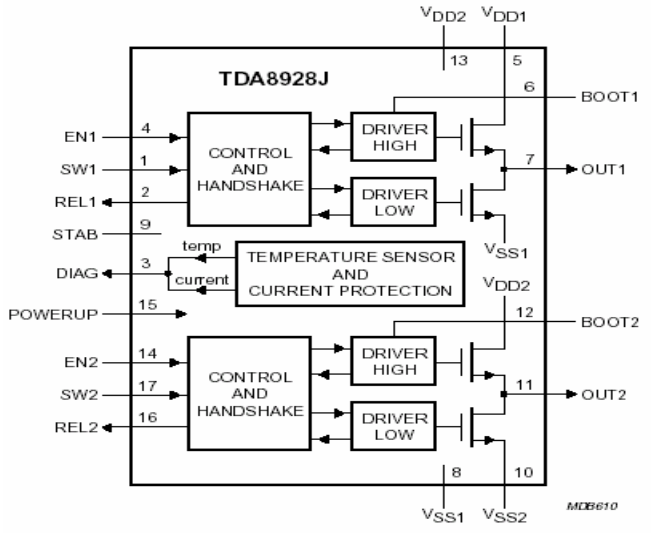


Fig.2 Pin configuration.

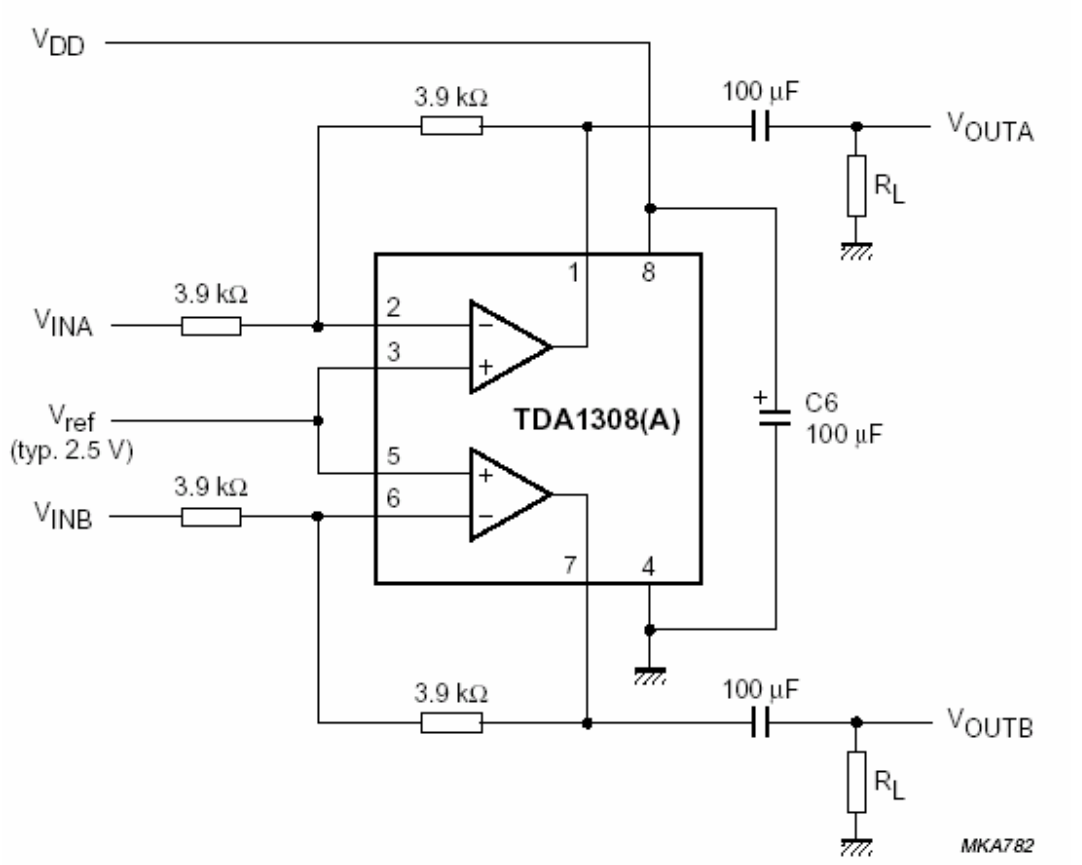


Audio inputs Main_L and Main_R is applied via voltage comparator LM393 to amplifier. PWM swicthing outputs are then filtered by 33UH and 470NF.

SOUND PERFORMANCE	
SOUND CALL UP TIME	Max. 4 sec.
MAXIMUM AUDIO OTPUT POWER (RF INPUT)	10W
MAXIMUM AUDIO OTPUT POWER (EXTERNAL INPUT)	10W
THD AT MAXIMUM AUDIO OUTPUT POWER (RF INPUT)	%10
THD AT MAXIMUM AUDIO OUTPUT POWER (EXTERNAL INPUT)	%10
THD AT 50 mW AUDIO OUTPUT POWER (RF INPUT)	%3 (IC spec.)
THD AT 50 mW AUDIO OUTPUT POWER (EXTERNAL INPUT)	%3 (IC spec.)
SIGNAL TO NOISE RATIO (RF INPUT)	50 db.
SIGNAL TO NOISE RATIO (EXTERNAL INPUT)	40 dB
SIGNAL TO BUZZ RATIO	40 dB
CROSSTALK: TV TO AV - AV TO TV	60 dB
RESIDUAL SOUND (RF INPUT)	20 mW/rms
RESIDUAL SOUND (EXTERNAL INPUT)	20 mW/rms
FREQUENCY RESPONSE (RF INPUT)	100 Hz – 10 kHz
FREQUENCY RESPONSE (EXTERNAL INPUT)	100 Hz – 10 kHz
BASS FREQUENCY RESPONSE (RF INPUT)	10 ± 2 dB
BASS FREQUENCY RESPONSE (EXTERNAL INPUT)	10 ± 2 dB
TREBLE FREQUENCY RESPONSE (RF INPUT)	10 ± 2 dB
TREBLE FREQUENCY RESPONSE (EXTERNAL INPUT)	10 ± 2 dB
POP NOISE	5 Vpp
HORIZONTAL HUM NOISE	15 mVrms
VERTICAL HUM NOISE	15 mVrms
VIDEO NOISE ON THE AUDIO OUTPUT	50 mVpp

2.2.3.2 HEADPHONE AMPLIFIER

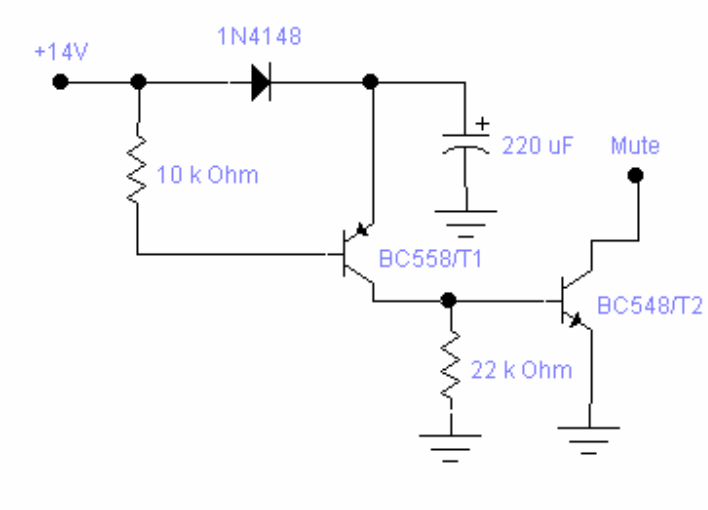
Headphone output is achieved by I2S out. I2S output is converted to anolog signal by DAC CS4334 and then applied to TDA1308T amplifier.



SubWoofer output is achieved by the same way, I2S ouptut is converted to analog signal by DAC CS4334 and applied to external SubWoofer amplifier board.DAC CS4334 will work at a rate of 32Fs MCLK/LRCK = 512, 256 or 128 and De-emphasis feature of CS4334 is disabled.

HEADPHONE PERFORMANCE	
MAXIMUM AUDIO OUTPUT POWER (RF INPUT)	22,5 ± 2,5 mWrms
MAXIMUM AUDIO OUTPUT POWER (EXTERNAL INPUT)	22,5 ± 2,5 mWrms
THD AT MAXIMUM AUDIO OUTPUT POWER (RF INPUT)	%10
THD AT MAXIMUM AUDIO OUTPUT POWER (EXTERNAL INPUT)	%10
THD AT 0.5 mW AUDIO OUTPUT POWER (RF INPUT)	%1
THD AT 0.5 mW AUDIO OUTPUT POWER (EXTERNAL INPUT)	%1
SIGNAL TO NOISE RATIO (RF INPUT)	40 dB
SIGNAL TO NOISE RATIO (EXTERNAL INPUT)	40 dB

2.2.2.3 POP NOISE PROTECTION CIRCUIT



This circuit is used to prevent pop noise in AC turn-off. While TV is working due to +14V. T1 is OFF . In turn-0ff situation BE voltage of T1 becomes negative and transistor goes to ON condition ,so it drives T2 and T2 pull-down mute pin to perform muting.

2.2.3 DEFLECTION & DISPLAY BLOCK

2.2.3.1 Horizontal Deflection

Deflection block consist of following main parts,

Horizontal driver transistor (Q601),
Horizontal driver (TR600),
HOT (Horizontal Output Transistor) (Q600),
FBT (TR601),
E/W transistor (Q602),
E/W coil (L601),
E/W injection Coil (Bridge Coil) (L602),
Linearity Coil (L603),
Flyback Capacitors (C608, C607),
S-correction capacitor (C615 ve C613),
Modulated S-correction capacitor (C611),

Hdrive signal is buffered and applied to line driver transistor by a capacitor.
Line driver produces necessary base currents, parallel diode to base series resistor speeds up the reverse base current.

UOC3 has soft-start and soft-stop features to have more safe operation. There are two base current adjustment resistors on the circuit. Collector current differs according to CRT sizes .

Tube dependent components are choosen to fit best picture performance by keeping;

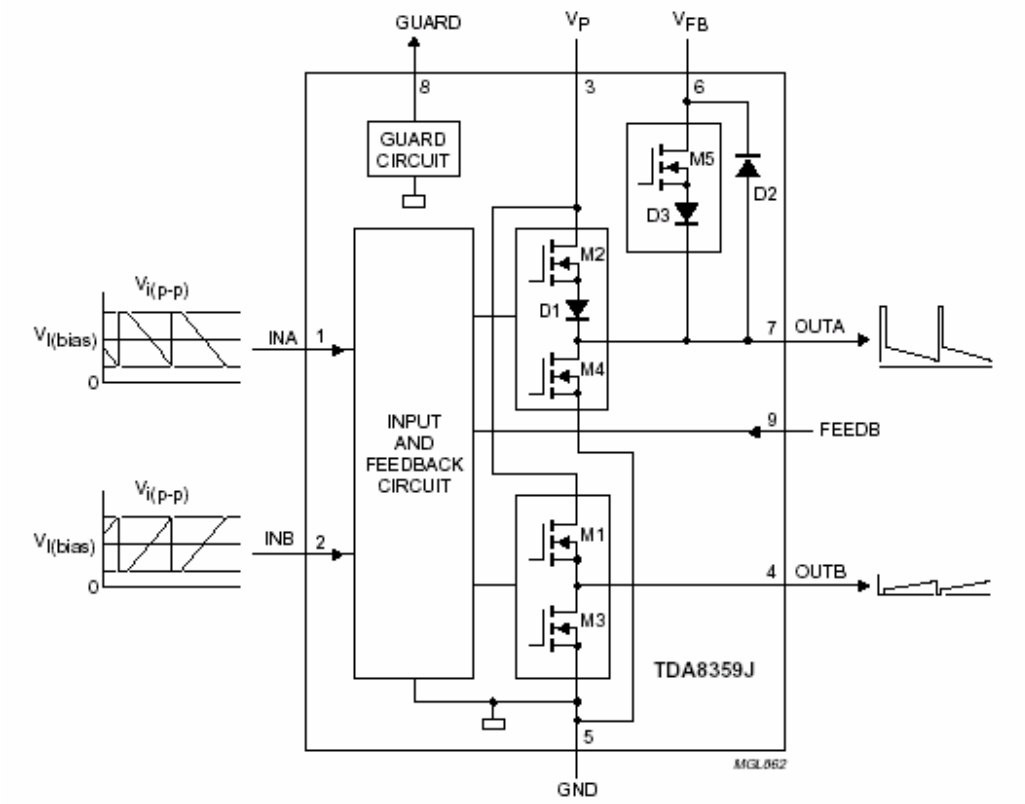
11,5 usec. Flyback time,
Max. 1300V. collector voltage (peak-detect mode measurement)
Max. 500V. at the diode modulator cathode (D605).
Max. 20V. (peak-detect mode measurement) at the E/W transistor drain.
Max. 200V video B+ voltage.

2.2.3.2 Vertical Deflection

TDA8359J (IC502) vertical amplifier is used for vertical deflection. It's 3,2A. current capability makes it enable to drive all 50Hz. CRT screen sizes.

Differential vertical drive signals; resistor network at inputs are chosen CF type to minimize temperature sensitivity of TV set. Those resistors can be changed to MF type in case of heat run failure.

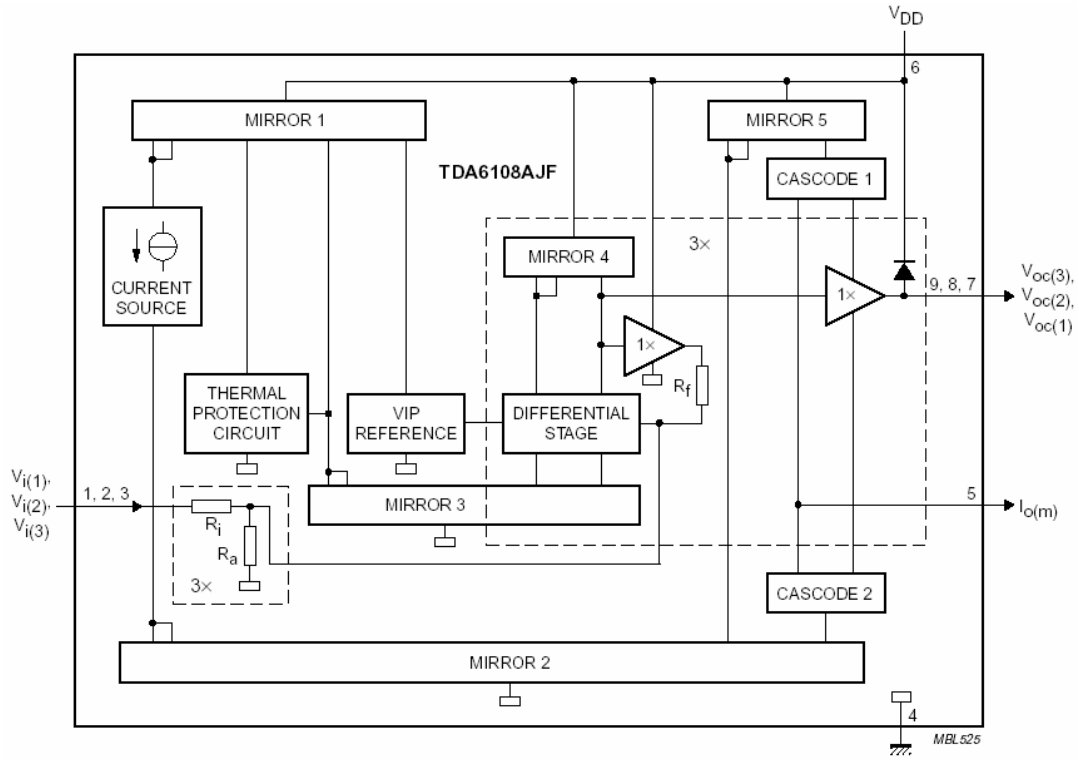
Power resistor R633, R634 values will change according to CRT sizes.



SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supplies						
V_P	supply voltage		7.5	12	18	V
V_{FB}	flyback supply voltage		$2 \times V_P$	45	66	V
$I_{q(P)(av)}$	average quiescent supply current	during scan	–	10	15	mA
$I_{q(FB)(av)}$	average quiescent flyback supply current	during scan	–	–	10	mA
P_{tot}	total power dissipation		–	–	10	W
Inputs and outputs						
$V_{i(p-p)}$	input voltage (peak-to-peak value)		–	1000	1500	mV
$I_{o(p-p)}$	output current (peak-to-peak value)		–	–	3.2	A
Flyback switch						
$I_{o(peak)}$	maximum (peak) output current	$t \leq 1.5$ ms	–	–	±1.8	A
Thermal data; in accordance with IEC 60747-1						
T_{stg}	storage temperature		–55	–	+150	°C
T_{amb}	ambient temperature		–25	–	+85	°C
T_j	junction temperature		–	–	150	°C

2.2.3.3 CRT Board

TDA6108AJF is used as RGB amplifier. Main feature of that triple amplifier is the increased fixed gain of 81. It's 8 MHz. Bandwidth at 100Vpp video signal makes it enable to use in all 50Hz. TV



applications.

SYMBOL	PIN	DESCRIPTION
$V_{i(1)}$	1	inverting input 1
$V_{i(2)}$	2	inverting input 2
$V_{i(3)}$	3	inverting input 3
GND	4	ground (fin)
I_{om}	5	black-current measurement output
V_{DD}	6	supply voltage
$V_{oc(3)}$	7	cathode output 3
$V_{oc(2)}$	8	cathode output 2
$V_{oc(1)}$	9	cathode output 1

CRT board have single and double focus CRT socket options.

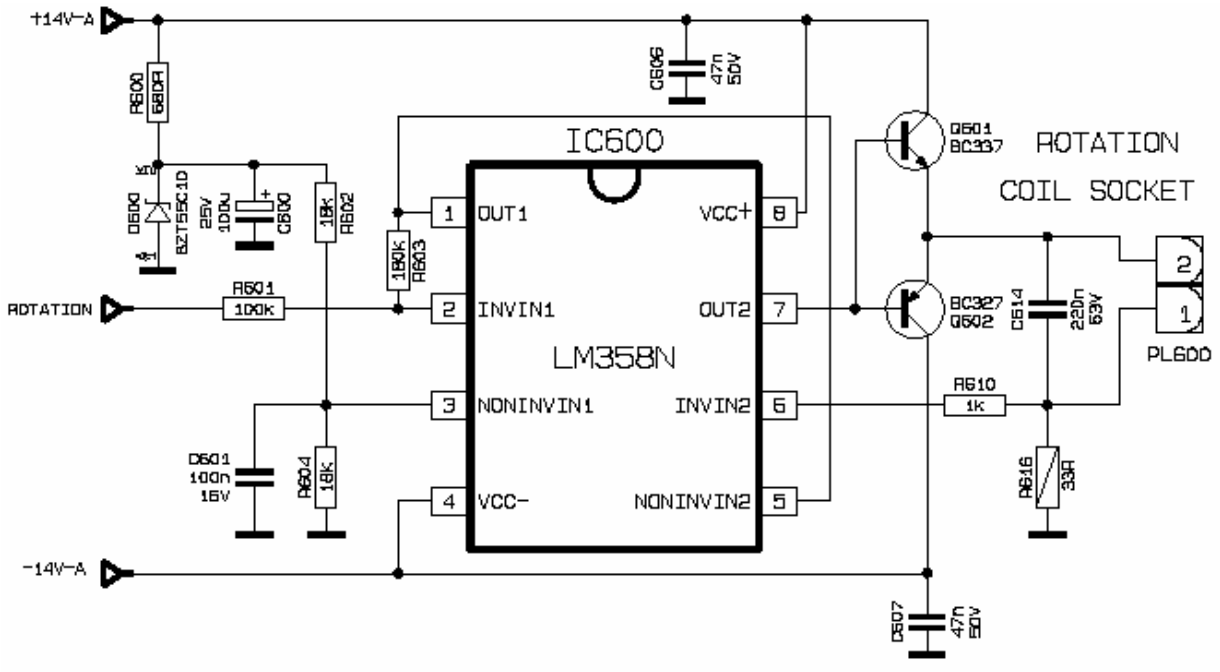
There are CC type 1,5K series flash current limiting resistors (R903, R904, R905) on the RGB lines. In addition to resistors BAV21 clamp diodes (IC901,IC902,IC903) are introduced.

Spot Killer circuit pulls G1 to –200V by Q700 at turn off instant.

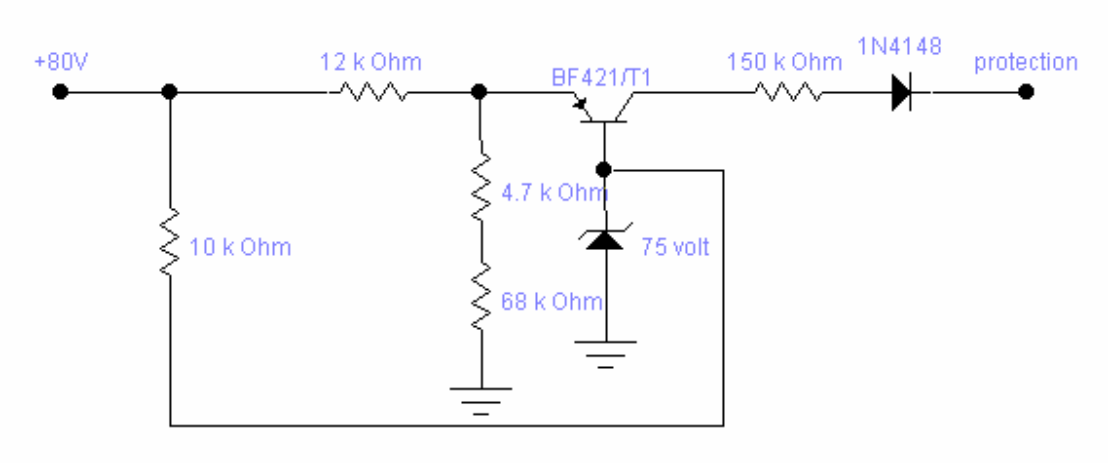
BSVM amplifier circuit modulates the beam to have sharper images at the adges of CRT. Basicly, it amplifies the software delayed controlled BSVM signal and apply it to BSVM winding of neck.

2.2.3.4 ROTATION

PWM rotation output of UOC3 is first converted to DC then applied to rotation circuit. OPAMP LM358N (IC600) and medium power transistors (Q601, Q602) performs DC amplification necessary for rotation coil.

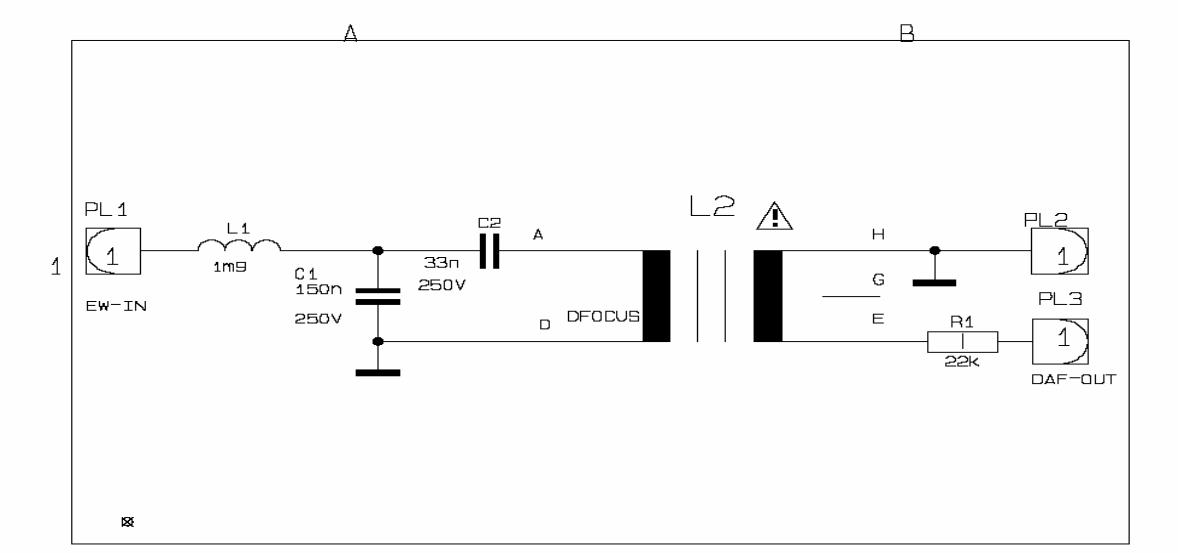


2.2.3.5 X-RAY PROTECTION



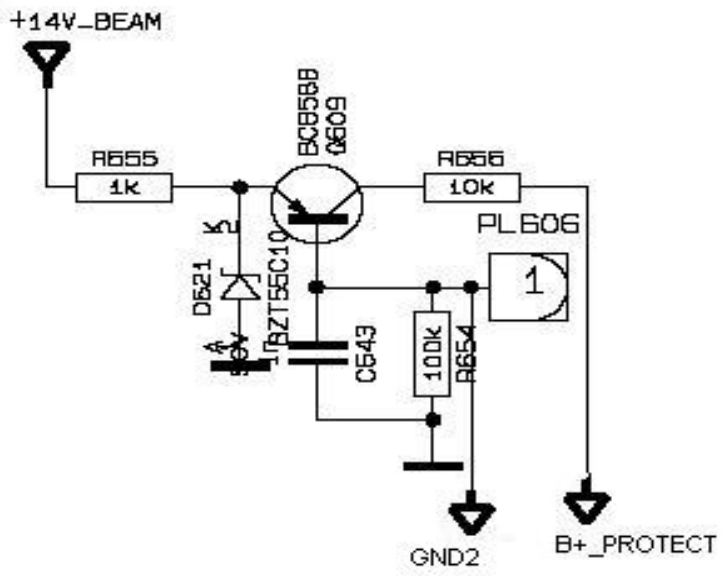
This circuit is used to protect the system X-ray caused by HV. While Anode voltage is bellow 33kv, T1 is off due to 80 volt because BE voltage of T1 becomes negative. While Anode voltage is above 33 kv. 80 voltage increases, it becomes approximately 90 volt. At that condition T1 is ON due to 90 volt because BE voltage of T1 becomes positive, so it drives protection.

2.2.3.6 DYNAMIC FOCUS



E/W injection signal is converted to sinus shape after it passes LC circuit. Then the signal is amplified via coil and applied to Dynamic focus.

2.2.3.7 SCREEN & FOCUS SHORT CIRCUIT PROTECTION



Above circuit is used for protection against screen & focus grounding. Basicly the base of PNP transistor Q609 is connected to screen&focus potentiometer of FBT, in another words FBT focus pack is connected to ground via R654. The voltage at the base of that transistor is normally higher then the zener voltage at the emitter. When any short circuit occurs at focus or screen the base voltage is decreased to a value lower then zener voltage, that forces transistor to conduction and trigers another circuit which will force UC to protection mode. In protection mode LED becomes RED and remote control does not work.

GEOMETRY PERFORMANCE	
ASPECT RATIO	
NON-LINEARITY (Horizontal & Vertical)	% 10
DE-CENTERING (Horizontal & Vertical)	% 1
OVER-SCANNING (Top, Bottom, Left, Right)	% 2,5
UNDER-SCANNING (Top, Bottom, Left, Right)	% 97,5
RASTER ROTATION / TILT	3 mm.
PARALELLOGRAM (Left counter, Right Counter)	% 1,5
TARPEZIUM (Horizontal, Vertical)	% 1,5
OUTLINE DISTORTION (Top, Bottom, Right, Left outline distortion)	% 1,5
INNER DISTORTION (Top, Bottom, Right, Left inner distortion)	% 1,5
BENDING (Top right, top left, bottom left, bottom right corner bending)	% 10
EHT AND DEFLECTION PERFORMANCE	
ANODE VOLTAGE	CRT spec.
BEAM CURRENT	CRT spec.
HEATER VOLTAGE	CRT spec.
EHT REGULATION	% 1,5
HORIZONTAL FLYBACK VOLTAGE	HOT spec.
HORIZONTAL FLYBACK TIME	12 usec. Max
VERTICAL FLYBACK VOLTAGE	Vertical IC spec.
VERTICAL FLYBACK TIME	1 msec. Max
SCREEN VOLTAGE	CRT spec.
FOCUS VOLTAGE	CRT spec.
FOCUSING	
PICTURE PERFORMANCE	
IMAGE CALL UP TIME	9 sec. Max
WHITE BALANCE	x=285 ± 3 , y=293 ± 3
MAXIMUM LUMINANCE	120 ± 10 Cd/m²
VIDEO BANDWIDTH	3,5 Mhz. Min
SIGNAL TO NOISE RATIO	40 dB min
2T PULSE WIDTH	200 ± 40 nsec
OVER-SHOOT	% 10 max
UNDER-SHOOT	% 10 min
CONTRAST RATIO	60 min
CONTRAST LEVEL	90 – 100V min
CROSSTALK: TV TO AV - AV TO TV	Should be not visible
TOLERANCE TO VISION OVER MODULATION	No effect up to %30 modulation
COLOUR PURITY	Not visible from 1,8m distance
COLOR SCYNCHRONISATION	0,5 sec delay max.
PICTURE SWAY	No picture shake allowed
MOIRE	No moire effect allowed

RINGING	No visible effect allowed
SMEARING	% 10
FLICKER	No flicker effect caused by brightnes control allowed
INTERLACE AND JITTER	No jitter is allowed
HANOVER BLIND	No hanover blind is allowed
HUM ON VISION	No hum bars allowed in picture
FLYBACK LINES	No visible flyback line allowed
FOLDOVER	No foldover in the picture allowed
CURTAIN EFFECT	No oscillation in picture allowed
MANHEIM EFFECT	% 1,5 max
MISCONVERGENCE	1,8 max.

2.2.4 SMPS BLOCK

2.2.4.1 PRIMARY BLOCK

AC power applied via AC inlet, line filter components prevent chassis from incoming noise of AC line, also prevents AC line against created noises by TV. Bridge rectifier and bulk capacitor converts AC voltage to DC voltage. Applied DC voltage to primary winding is then swicthed via MOSFET by primary controller in a controlled manner.

SMPS controller works on quasi-resonant PWM and gets first supply voltage from AC line (SMPS Controller supply). Controller drives MOSFET according to feedback information supplied by shunt regulator and opto-coupler, according to that information adjusts on-time of MOSFET for required power. After the start-up in normal operation mode SMPS controller is supplied by SMT.

Primary block consist of following main parts,

AC Inlet (PL800),

Fuse (F800),

Varistor (R800 and R802),

Line Filter For EMC (C801,L800,C802),

SMPS Controller (IC804),

SMPS Controller supply for first Start-up and at Stand-by (D823, C800, D801, R801),

Bridge Rectifier (D800),

Rectifier For SMPS Controller(D802),

PFC Coil Socket (PL801),

PFC Coil Dumping Cap (C807),

Bulk Cap (C810),

Clamping Circuitry (R810, C814, C815, D816),

SMT (Switch Mode Transformer) (TR800),

SMT Driver MOSFET (Q802),

Current Sense Resistors (R814, 815,R816, R819),

Protection Components for MOSFET Failure (D805, D806, R813),

2.2.4.2 SECONDARY BLOCK

Switching primary winding of SMT induces voltages to secondary windings of SMT. Induced voltages are then rectified by secondary recitification diodes and capacitors.

Secondary block consist of following main parts,

Optocoupler for feedback (IC805),

Shunt Requlator for Requlation at Normal Mode (IC806),

B+ Sense Resistors for Apply Shunt Requlator (R833, R834, VR800, R831),

Rectifier and DC line Components for B+ (D817, C827, C828, C826, L805, D811, R867),

B+ Over Current Sense Components (R837,C840,R850, R838, Q806, R851, R853, C850,D813),

Audio + and - Supply Rectifiers and DC line Components (D818,C829, C831, R839, C841, D820, C830, C832, R840, C842)

+ 14 Supply Rectifiers and DC line Components (D819, C833,C843),

+ 8V Supply Rectifiers and DC line Components (D808, C834, C844),

+ 8V Controller Supply Rectifiers and DC line Components at **Normal Mode**(D809,C836),

+ 8V Controller Supply Rectifiers and DC line Components at **Stand by Mode** (IC802, L804, R847, D822),

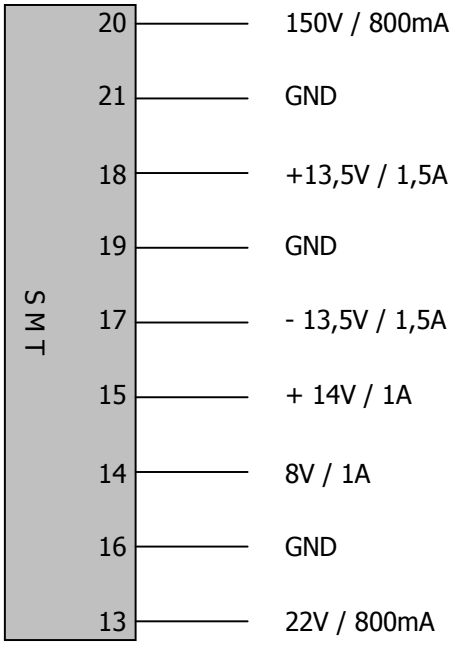
IC 415 (Tristor) Trigering components (R848, C849),

IC 415 (Tristor) Trigering Control Components (C848, R849, Q810, R846),

Short Circuit Sense For +5V (R862, R863, Q813, R861, D815),

Power Fail or Short Circuit Inform Circuit to Controller (R859, R860, C851, Q812),

SMT secondary voltages / currents;

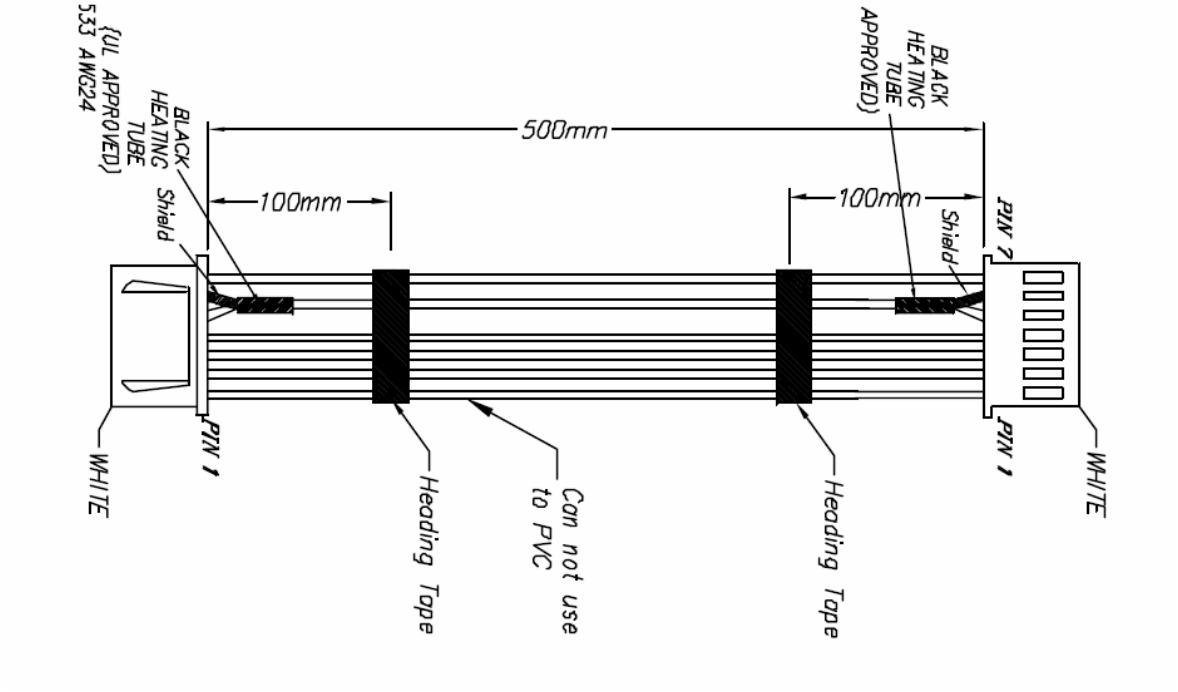


Stand-by and Normal-mode controlled by microcontroller. On/Off port is high when TV is in stand-by and low at normal-mode.

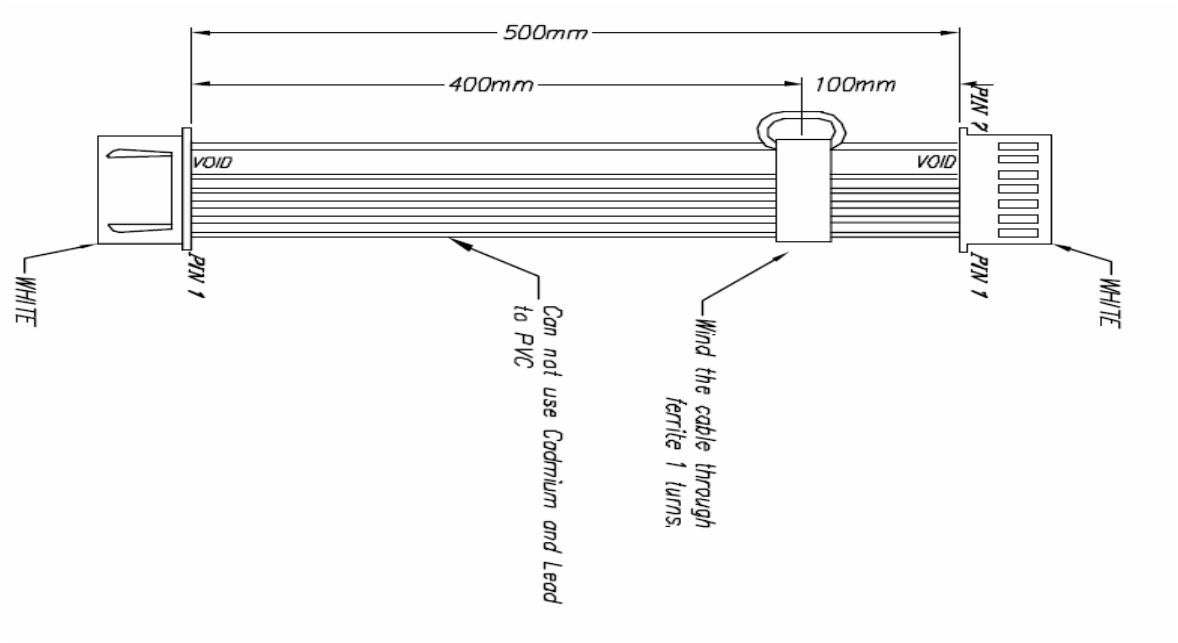
POWER SUPPLY PERFORMANCE	
USABLE MINIMUM AND MAXIMUM OPERTAING VOLTAGES (170 V- 270V)	170 V. min , 270 V. max
DROP OUT VOLTAGE	155 V.
START UP VOLTAGE	170 V.
POWER CONSUMPTION	< 1W in Stand-by, 160W max.
SMPS OUTPUT VOLTAGES	± 0,5 V. of design value
SMPS FET DRAIN VOLTAGE	% 90 of MOSFET spec.
SMPS FET GATE VOLTAGE	% 90 of MOSFET spec.
SMPS FET OPERATING FREQUENCY	Fix

2.2.5 CABELING

RGB cables are shown below. First is the RGB signal cable. Second is the RGB power cable.



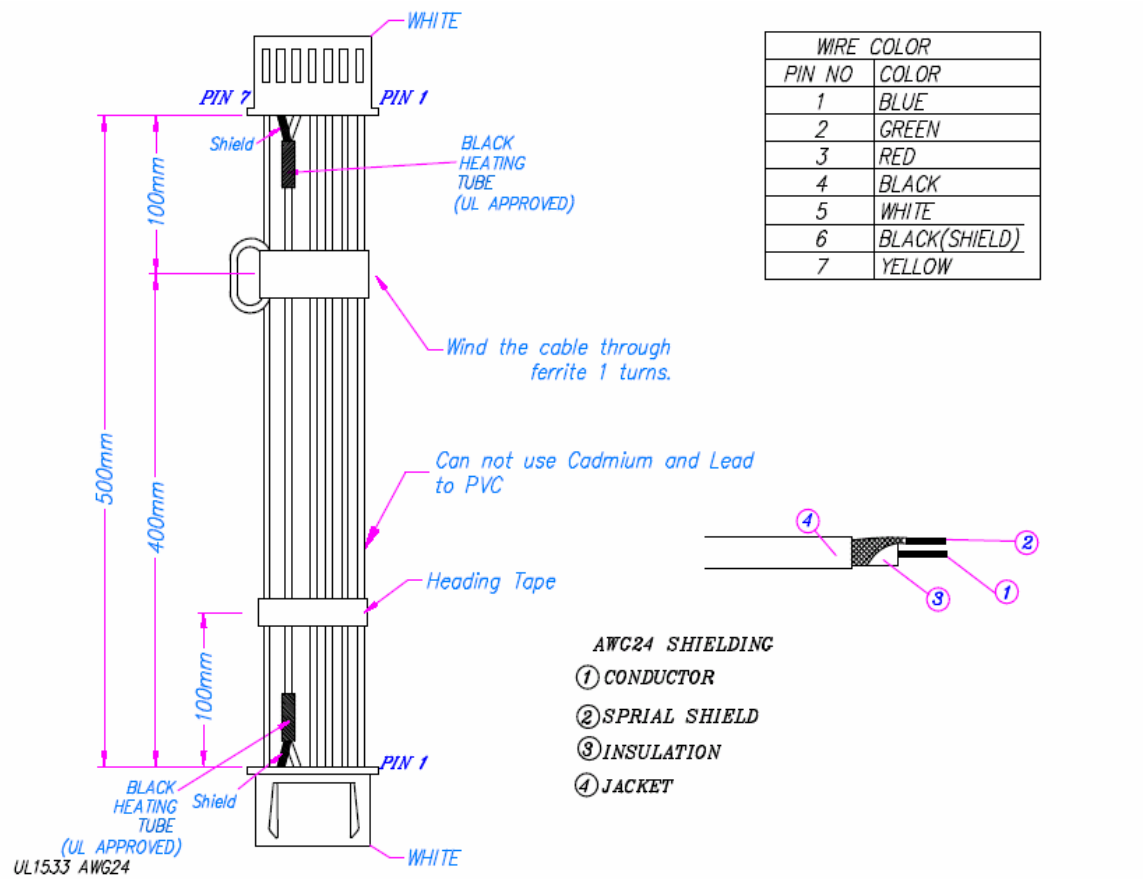
Pin NO	Signal
1	Blue
2	Green
3	Red
4	GND
5	BLKIN
6	GND
7	BSVM



Pin NO	Signal
1	+14 volt
2	+80 volt
3	EHTINFO
4	HEATER
5	GND
6	-
7	200 volt

2.2.6 CABLE SPECs

2.2.6.1 RGB CABLE



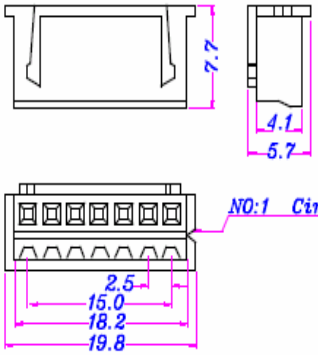
WIRE COLOR	
PIN NO	COLOR
1	BLUE
2	GREEN
3	RED
4	BLACK
5	WHITE
6	BLACK(SHIELD)
7	YELLOW

UL1533 AWG24

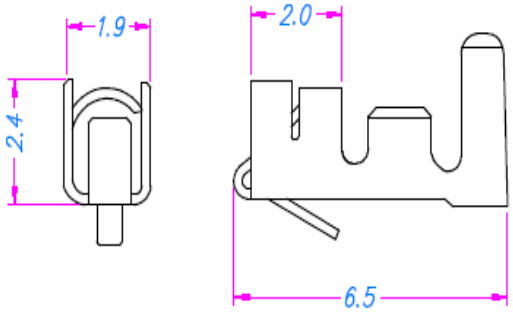
RATING	CONDUCTOR (Tinner Annealed) Copper Wire)			INSULATION (Heat Resistance) Semi-Rigid Vinyl)		SPIRAL SHIELD (Tinned Annealed) Copper Wire)		JACKET (Heat Resistance) PVC)		MAX. CONDUCTOR RESISTANCE	MIN. INSULATION RESISTANCE	DIELECTRIC STRENGTH
VOLTAGE (V)	SIZE (AWG)	COMPOSITION (N/mm)	OUTER DIAMETER (mm)	THICKNESS (mm)	OUTER DIAMETER (mm)	ELEMENT WIRE DIAMETER (mm)	OUTER DIAMETER (mm)	THICKNESS (mm)	OUTER DIAMETER (mm)	(20℃) (OHM/km)	(20℃) (MOHM-km)	(AC.V/min.)
Not specified	24	7/0,203	0,61	0,27	1,15	0,10	1.35	0,35	2,05	92,3	10	1,500

UL1007 AWG24

RATING	CONDUCTOR (Tinner Annealed) Copper Wire or OS-1)			INSULATION (Heat Resistant PVC)		MAX. CONDUCTOR RESISTANCE (20℃) (OHMkm)	MIN. INSULATION RESISTANCE (20℃) (MOHMkm)	DIELECTRIC STRENGTH (AC.V/min.)
VOLTAGE (V)	SIZE (AWG)	COMPOSITION (N/mm)	OUTERDIAME-TER (mm)	THICKNESS (mm)	OUTERDIAME-TER (mm)			
300	24	11/0.16	0.64	0.46	1.56	88.6	15	2000



ELECTRICAL SPECIFICATIONS
CURRENT RATING:3.0A AC,DC
VOLTAGE RATING.250V AC,DC
TEMPARETURE RANCE:-25'C to +85'C
CONTACT RESISTANCE:10m ohm max.
INSULATION RESISTANCE:1000M ohm min.
WITHSTANDING VOLTAGE:1000V AC/minutune



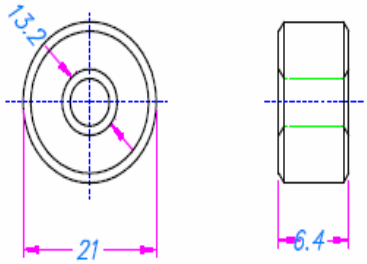
TERMINAL

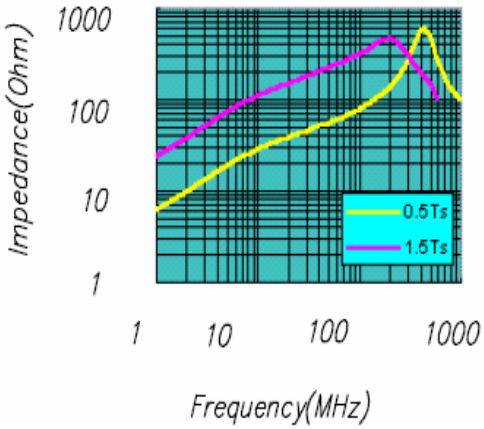
Applicable wire: AWG22-30
Material:Phos. Bronze/Brass
Finish: Tin/plated 40 μ"min.
Thickness: 0.2mm
INSULATION RESISTANCE : 1000M ohm min.
WITHSTANDING VOLTAGE :1000V AC/minute

FERRITE CORE 21X13.2X6.4
VESTEL KOD : 30018527

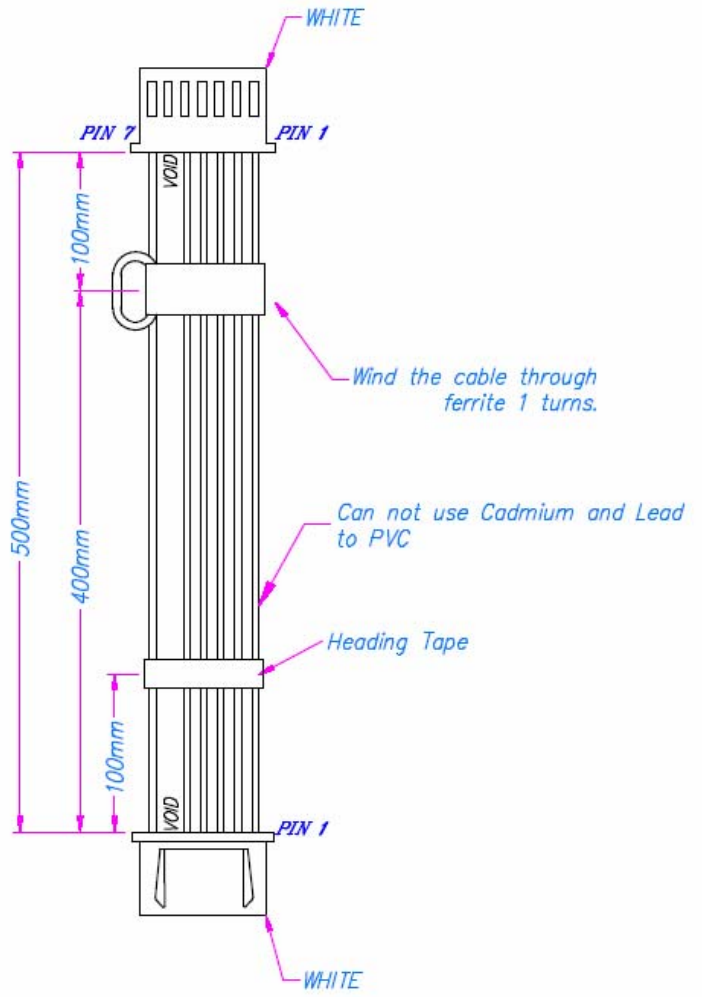
CROWN FERRITE

L62 T 21*13.2*6.4





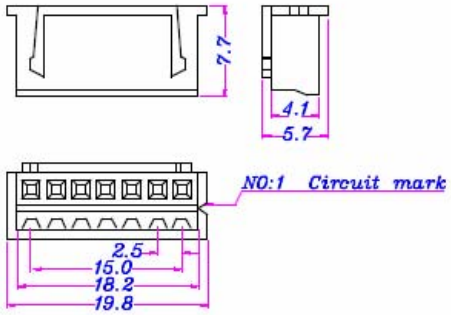
2.2.6.2 200V CABLE (with BSVM)



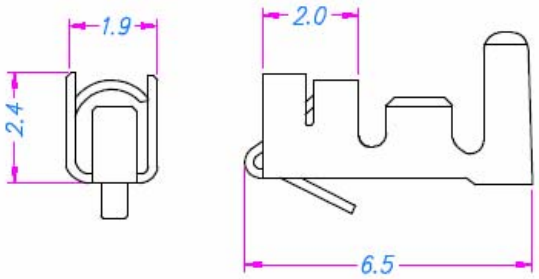
WIRE COLOR	
PIN NO	COLOR
1	GREEN
2	BLUE
3	YELLOW
4	ORANGE
5	BLACK
6	VOID
7	RED

UL1007 AWG24

RATING	CONDUCTOR (Tinner Annealed) Copper Wire or OS-1)			INSULATION (Heat Resistant PVC)		MAX. CONDUCTOR RESISTANCE (20℃) (OHMkm)	MIN. INSULATION RESISTANCE (20℃) (MOHMkm)	DIELECTRIC STRENGTH (AC.V/min.)
VOLTAGE (V)	SIZE (AWG)	COMPOSITION (N/mm)	OUTERDIAME-TER (mm)	THICKNESS (mm)	OUTERDIAME-TER (mm)			
300	24	11/0.16	0.64	0.46	1.56	88.6	15	2000



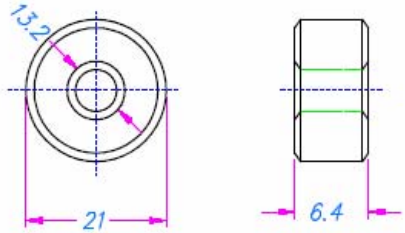
ELECTRICAL SPECIFICATIONS
CURRENT RATING: 3.0A AC,DC
VOLTAGE RATING.250V AC,DC
TEMPARETURE RANCE: -25'C to +85'C
CONTACT RESISTANCE: 10m ohm max.
INSULATION RESISTANCE: 1000M ohm min.
WITHSTANDING VOLTAGE: 1000V AC/minutune

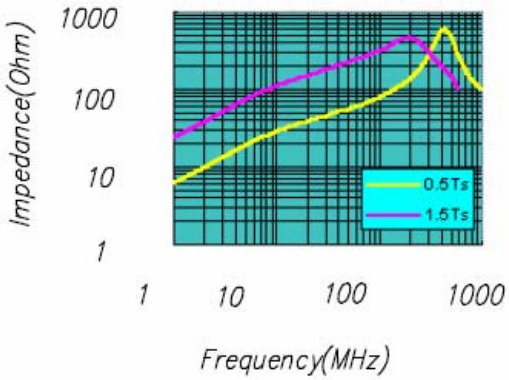


TERMINAL

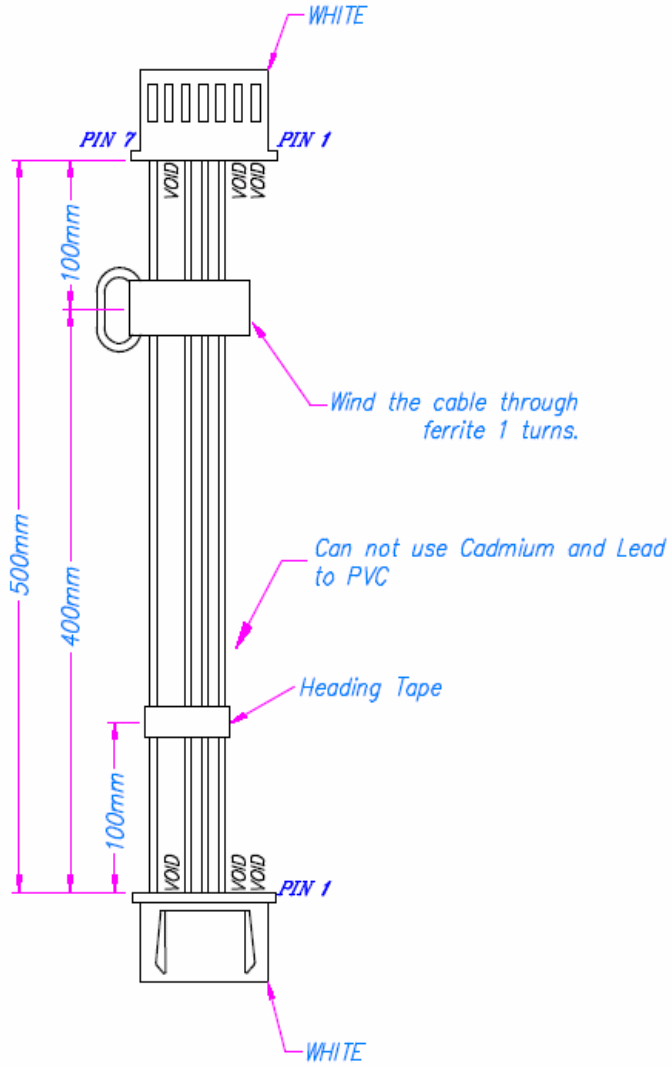
Applicable wire: AWG22-30
Material: Phos. Bronze/Brass
Finish: Tin/plated 40 μ"min.
Thickness: 0.2mm
INSULATION RESISTANCE : 1000M ohm min.
WITHSTANDING VOLTAGE :1000V AC/minute

FERRITE CORE 21X13.2X6.4
VESTEL KOD : 30018527
CROWN FERRITE
L62 T 21*13.2*6.4





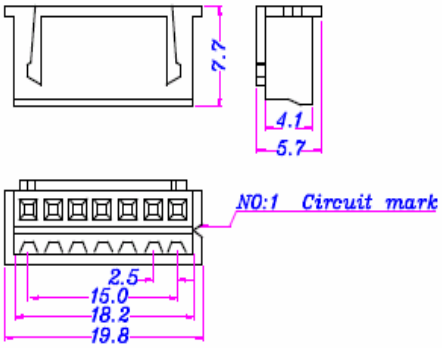
2.2.6.3 200V CABLE(without BSWM)



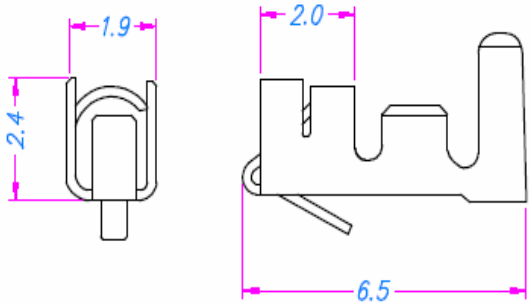
WIRE COLOR	
PIN NO	COLOR
1	VOID
2	VOID
3	YELLOW
4	ORANGE
5	BLACK
6	VOID
7	RED

UL1007 AWG24

RATING	CONDUCTOR (Tinner Annealed) Copper Wire or OS-1)			INSULATION (Heat Resistant PVC)		MAX. CONDUCTOR RESISTANCE (20℃) (OHM/km)	MIN. INSULATION RESISTANCE (20℃) (MOHM/km)	DIELECTRIC STRENGTH (AC.V/min.)
VOLTAGE (V)	SIZE (AWG)	COMPOSITION (N/mm)	OUTERDIAMETER (mm)	THICKNESS (mm)	OUTERDIAMETER (mm)			
300	24	11/0.16	0.64	0.46	1.56	88.6	15	2000



ELECTRICAL SPECIFICATIONS
CURRENT RATING: 3.0A AC,DC
VOLTAGE RATING.250V AC,DC
TEMPARETURE RANCE: -25'C to +85'C
CONTACT RESISTANCE: 10m ohm max.
INSULATION RESISTANCE: 1000M ohm min.
WITHSTANDING VOLTAGE: 1000V AC/minutune



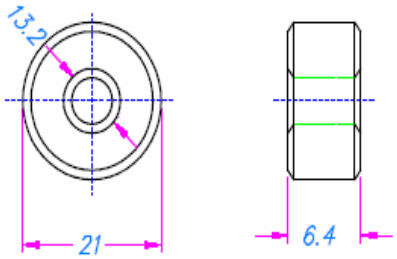
TERMINAL

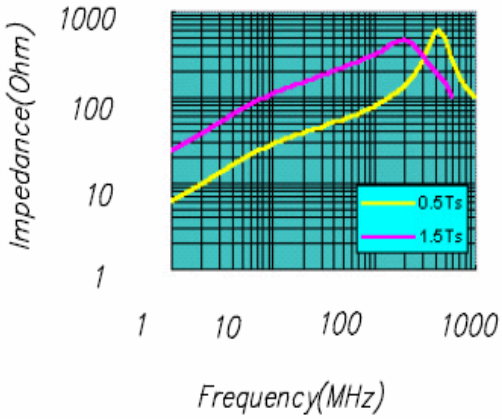
Applicable wire: AWG22-30
Material: Phos. Bronze/Brass
Finish: Tin/plated 40 μ"min.
Thickness: 0.2mm
INSULATION RESISTANCE : 1000M ohm min.
WITHSTANDING VOLTAGE : 1000V AC/minute

FERRITE CORE 21X13.2X6.4
VESTEL KOD : 30018527

CROWN FERRITE

L62 T 21*13.2*6.4





2.2.7. SAW FILTER

K3953M:
Standard
B/G, D/K, I, L/L'
Features
TV IF video filter with Nyquist slopes at 33,90 MHz and 38,90 MHz
Constant group delay
Suitable for CENELEC EN 55020
Terminals
Tinned CuFe alloy
Pin configuration
1 Input
2 Input - ground
3 Chip carrier - ground
4 Output
5 Output

K3958M:
Standard
B/G, D/K, I, L/L'
Features
TV IF video filter with Nyquist slopes at 33.90 MHz and 38.90 MHz
Constant group delay
Terminal and Pin configuration are the same with K3953M
K9356M:
Standard
B/G, D/K, I, L
Features
TV IF audio filter with pass band for sound carriers at 32,40 MHz (D/K, L), 32,90 MHz (I) and 33,40 MHz (B/G)
Terminal and Pin configuration are the same with K3953M

K9656M:
Standard
B/G, D/K, I, L/L'
Features
TV IF audio filter with two channels
Channel 1 (L') with one pass band for sound carriers at 40,40 MHz (L') and 39,75 MHz (L'- NICAM)
Channel 2 (B/G, D/K, L, I) with one pass band for sound carriers between 32,35 MHz and 33,40 MHz
Terminal and Pin configuration are the same with K3953M

2.2.8. TUNER

The hardware and software of the TV is suitable for tuners, supplied by different companies, which are selected from the Service Menu. These tuners can be combined VHF, UHF tuners suitable for CCIR systems B/G, H, L, L´, I/I´, and D/K. The tuning is available through the digitally controlled I^2C bus (PLL). Below you will find info on one of the Tuners in use.

General description of UV1316:

The UV1316 tuner belongs to the UV 1300 family of tuners, which are designed to meet a wide range of applications. It is a combined VHF, UHF tuner suitable for CCIR systems B/G, H, L, L', I and I'. The low IF output impedance has been designed for direct drive of a wide variety of SAW filters with sufficient suppression of triple transient.

Features of UV1316:

1. Member of the UV1300 family small sized UHF/VHF tuners
2. Systems CCIR: B/G, H, L, L', I and I'; OIRT: D/K
3. Digitally controlled (PLL) tuning via I^2C-bus
4. Off-air channels, S-cable channels and Hyperband
5. World standardized mechanical dimensions and world standard pinning
6. Compact size
7. Complies to "CENELEC EN55020" and "EN55013"

Pinning:

1.	Gain control voltage (AGC)	:	4.0V, Max: 4.5V
2.	Tuning voltage		
3.	I²C-bus address select	:	Max: 5.5V
4.	I²C-bus serial clock	:	Min:-0.3V, Max: 5.5V
5.	I²C-bus serial data	:	Min:-0.3V, Max: 5.5V
6.	Not connected		
7.	PLL supply voltage	:	5.0V, Min: 4.75V, Max: 5.5V
8.	ADC input		
9.	Tuner supply voltage	:	33V, Min: 30V, Max: 35V
10.	Symmetrical IF output 1		
11.	Symmetrical IF output 2		

3 AK49 CHASSIS MANUAL ADJUSTMENTS PROCEDURE

Before starting with the alignment procedure, make sure that all the potentiometers on the chassis and also screen and focus pots are in the medium position.

3.1. SMPS B+ ADJUSTMENT

Prior to first run of TV chasis , FBT screen and focus potentiometers should be set to middle positions then B+ voltage is measured. If this value is different from the list below ;VR800 is adjusted to specified value below.

SYSTEM VOLTAGE	*TYPE OF CRT*
145 V±0.5V	32" 16:9 RF Panasonic W76EKW10X21
145 V±0.5V	28" 16:9 RF Thompson THO021X131

3.2.AFC ADJUSTMENTS

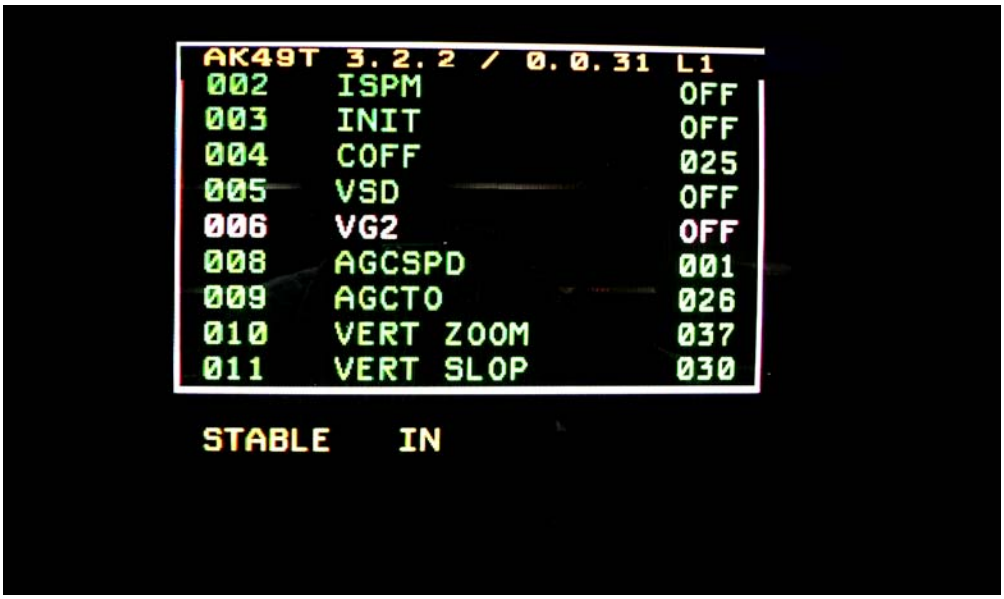
AFC is automatically adjusted from software, when f (IF) is selected 38.9MHz for negative modulation and 33.9MHz for positive modulation from the service menu.

3.3. FOCUS ADJUSTMENTS

TV is tuned to the signal. Then focus potantiometer (the upper pot on the rear side of the FBT transformer) is adjusted for optimum focusing drive. For double focus tubes,there are two focus potentiometer; each of them should be adjusted for optimum focus on the screen

3.4 SCREEN ADJUSTMENTS

For screen adjustment VG2 item should be selected at the service menu.
then the screen potentiometer is gently adjusted until the "**STABLE IN"** sign appears.



4 15.AK49 CHASSIS PRODUCTION SERVICE MODE ADJUSTMENTS

All system, geometry and white balance alignments are performed in production service mode. Before starting the production mode alignments, make sure that all manual adjustments are done correctly. To start production mode alignments enter the MAIN MENU and then press the digits 4, 7, 2 and 5

To store the settings press "OK" button.

Entire service menu parameters of AK49 CHASSIS are listed below.

FAPS

The option of APS (Automatic Program Searching) item are ON and OFF. In order to active APS installation procedure when TV is turned for the very first time, select ON. Inorder to start TV without APS installation procedure, select OFF.

S-No	OSD	Description	MinMax	Def.
001	FAPS	First APS, activates factory settings and when TV is opened first APS menu comes.		

ISPM

S-No	OSD	Description	MinMax	Def.
002	ISPM	In System Programming Mode, for software update.	On/Off	Off

INIT

S-No	OSD	Description	MinMax	Def.
003	INIT	Initialise NVM	On/Off	Off

COFF

S-No	OSD	Description	MinMax	Def.
004	COFF	Cut off		

VSD

S-No	OSD	Description	MinMax	Def.
005	VSD	Vertical scan disable	0..63	31

VG2

S-No	OSD	Description	MinMax	Def.
006	VG2	Adjustment Vg2 voltage.	0..63	31

AGCSPD

S-No	OSD	Description	MinMax	Def.
008	AGCSPD	IF AGC speed	0..3	1

AGCTO

S-No	OSD	Description	MinMax	Def.
009	AGCTO	AGC Take over. Also used as TOP when an internal AGC tuner is used.	0..63	33

VERT ZOOM

S-No	OSD	Description	MinMax	Def.
010	VERT ZOOM	Vertical zoom for 16:9	0..63	35

VERT SLOP

S-No	OSD	Description	MinMax	Def.
011	VERT SLOP	Vertical slope	0..63	37

VERT SHIFT

Change Vertical Shift by pressing "◄/►" buttons till the test pattern is vertically centered. Horizontal line at the center of the test pattern is in equal distance both to upper and lower side of the picture

tube. Check and readjust V-SHIFT item if the adjustment becomes improper after some other geometric adjustments are done.

S-No	OSD	Tanım	MinMax	Def.
012	VERT SHIFT	Vertical shift for Wide Screen 4:3, 16:9	0..63	25

VERT AMP

Change Vertical Amplitude by pressing "◄/►" buttons till horizontal black lines on both the upper and lower part of the test pattern become very close to the upper and lower horizontal sides of picture tube and nearly about to disappear. Check and readjust V-SIZE item if the adjustment becomes improper after some other geometric adjustments are done.

S-No	OSD	Description	MinMax	Def.
013	VERT AMP	Vertical amplitude (VA)	0..63	33

SCORRECTION

Change S-Correction by pressing "◄/►" buttons till the size of squares on both the upper and lower part of test pattern become equal to the squares laying on the vertical center of the test pattern. Check and readjust S-COR item if the adjustment becomes improper after some other geometric adjustments are done.

S-No	OSD	Description	MinMax	Def.
014	SCORRECTION	S-Correction	0..63	11

V-LINC

S-No	OSD	Description	MinMax	Def.
015	V-LINC	VLx, 0: Tam, 1: Sadece alt, 2: Sadece üst	0..2	0

V-LINEARTY

Change Vertical linearity by pressing "◄/►" buttons till all the size of squares of the test pattern become in equal size from the top of the screen to its bottom of the whole screen. Check and readjust LINRT item if the adjustment becomes improper after some other geometric adjustments are done. (especially after than S-COR adjustment)

S-No	OSD	Description	MinMax	Def.
016	V-LINEARTY	Vertical linearity	0..63	32

EW WIDTH

Change EW width by pressing "◄/►" buttons till no under-scan condition will happen, i.e. no white bars on the left and right side of the test pattern will be visible nor picture will be so wide. Check and readjust H-SIZE item if the adjustment becomes improper after some other geometric adjustments are done.

S-No	OSD	Description	MinMax	Def.
017	EW WIDTH	East West width for 16:9	0..63	48
		East West width for 4:3	0..63	18

HOR SHIFT

Change Horizontal Shift by pressing "◄/►" buttons till the the test pattern is horizontally in equal distance both to right and left sides of the picture tube. Check and readjust H-SHIFT item if the adjustment becomes improper after some other geometric adjustments are done.

S-No	OSD	Description	MinMax	Def.
018	HOR SHIFT	Horizontal shift	0..63	31

EW PARAB

Change EW Parabol by pressing "◄/►" buttons till vertical lines close to the both sides of the picture frame become parallel to vertical sides of picture tube without any bending to left or to right side of the screen. Check and readjust PARAB item if the adjustment becomes improper after some other geometric adjustments are done.

S-No	OSD	Description	MinMax	Def.
019	EW PARAB	East West Parabola width 16:9	0..63	25
		East West Parabola width 4:3	0..63	35

TRAPEZ

Change Trapezium by pressing "◄/►" buttons till vertical lines, especially lines at the sides of the picture frame became parallel to the both sides of picture tube as close as possible. Check and readjust TRPEZ item if the adjustment becomes improper after some other geometric adjustments are done.

S-No	OSD	Description	MinMax	Def.
020	TRAPEZ	East West Trapezium for 16:9	0..63	26
		East West Trapezium for 4:3	0..63	30

UC PARAB

Change Upper Correction by pressing "◄/►" buttons till vertical lines at the upper corners of the picture frame become vertical and parallel to vertical corner sides of picture tube. Check and readjust U.COR item if the adjustment becomes improper after some other geometric adjustments are done.

S-No	OSD	Description	MinMax	Def.
021	UC PARAB	Upper Corner Parabola for 16:9	0..63	1
		Upper Corner Parabola for 4:3	0..63	13

LC PARAB

Change Lower Correction by pressing "◄/►" buttons till vertical lines at the lower corners of the picture frame become vertical and parallel to vertical corner sides of picture tube. Check and readjust L.COR item if the adjustment becomes improper after some other geometric adjustments are done.

S-No	OSD	Description	MinMax	Def.
022	LC PARAB	Lower Corner Parabola for 16:9	0..63	5
		Lower Corner Parabola for 4:3	0..63	16

HOR BOW

Change Horizantal Bow by pressing "◄/►" buttons till the vertical lines especially ones close to the left and right sides will of equal and symmetrical bending, i.e. they together will neither be towards left side nor right side. Check and readjust BOW item if the adjustment becomes improper after some other geometric adjustments are done.

S-No	OSD	Description	MinMax	Def.
023	HOR BOW	Horizontal Bow for 16:9	0..63	28
		Horizontal Bow for 4:3	0..63	42

PARALLEL

S-No	OSD	Description	MinMax	Def.
024	PARALLEL	East West Parabola Width 16:9	0..63	34
		East West Parabola Width 4:3	0..63	33

TUBE

S-No	OSD	Description	MinMax	Def.
025	TUBE	4:3 picture tube used or 16:9 picture tube used	0 = 16:9 1 = 4:3	Depends on the chassis selected.

60HZ EWW

S-No	OSD	Description	MinMax	Def.
026	60HZ EWW	60Hz EW Width offset	0..63	31

60HZ HSH

S-No	OSD	Description	MinMax	Def.
027	60HZ HSH	60Hz Horizontal Shift offset	0..63	31

60HZ VSH

S-No	OSD	Description	MinMax	Def.
028	60HZ VSH	60Hz Vertical Shift offset	0..63	31

60HZ VZ

S-No	OSD	Description	MinMax	Def.
029	60HZ VZ	60Hz Vertical Zoom offset	0..63	31

TRCKE

S-No	OSD	Description	MinMax	Def.
030	TRCKE	EHT Tracking mode	Vertical only Vertical and EW	Vertical only

ROT

This adjustment only works when the TV has rotation option. Change TILT by pressing "◄/►" buttons to rotate the complete raster clock-wise and counter clock-wise depending on the CRT. Check and readjust TRPEZ item if the adjustment becomes improper after some other geometric adjustments are done.

S-No	OSD	Description	MinMax	Def.
031	ROT	Rotation	0..63	49

ROT-M

S-No	OSD	Description	MinMax	Def.
032	ROT-M	Enable Rotation item in the menu.	0..1	1

HBL

When the reproduction of 4 : 3 pictures on a 16 : 9 picture tube is realised by means of a reduction of the horizontal scan amplitude the edges of the picture may slightly be disturbed. This effect can be prevented by adding an additional blanking to the RGB signals. The blanking pulse is derived form the horizontal oscillator and is directly related to the incoming video signal (independent of the flyback pulse). This blanking is activated with the HBL bit.

S-No	OSD	Description	MinMax	Def.
033	HBL	RGB Blanking Mode	On/Off	On

WBF

A wide blanking pulse can be activated in the RGB outputs by means of the HBL bit in subaddress 43H. The start of this blanking can be adjusted by means of the WBF

S-No	OSD	Description	MinMax	Def.
034	WBF	start of wide blanking	0..15	10

WBR

A wide blanking pulse can be activated in the RGB outputs by means of the HBL bit in subaddress 43H. The end of this blanking can be adjusted by means of the WBF

S-No	OSD	Description	MinMax	Def.
035	WBR	end of wide blanking	0..15	8

OIF

This control is intended to correct for DC offset in the IF-PLL to improve the S/N ratio of the intercarrier sound signal.

S-No	OSD	Description	MinMax	Def.
038	OIF	Correct DC offset in the IF-PLL	0..63	32

IF

The IF-PLL demodulator uses an internal VCO (no external LC-circuit required) which is calibrated by means of a digital control circuit which uses the clock frequency of the m-Controller as a reference. The required IF frequency for the various standards can be set

S-No	OSD	Description	MinMax	Def.
039	IF	PLL demodulator frequency	58P75; 45P75; 38P9 ; 38P0 ; 33P4 ; 33P9/43P008	38P9

OFR

S-No	OSD	Description	MinMax	Def.
040	OFR	Option Enable Frequency in Install Menu	0..1	1

FFI

Fast filter IF-PLL; increased time constant & normal time constant

S-No	OSD	Description	MinMax	Def.
041	FFI	Fast filter IF-PLL	0, 1	0

BS1

S-No	OSD	Description	MinMax	Def.
042	BS1	Tuner Band VHF1	0..15	1

BS2

S-No	OSD	Description	MinMax	Def.
043	BS2	Tuner Band VHF3	0..15	2

BS3

S-No	OSD	Description	MinMax	Def.
044	BS3	Tuner Band UHF	0..15	4

CB

S-No	OSD	Description	MinMax	Def.
045	CB	Tuner Control Byte	0..255	142

B1-H

S-No	OSD	Description	MinMax	Def.
046	B1-H	Tuner VHF1 Boundary High Byte	0..255	12

B1-L

S-No	OSD	Description	MinMax	Def.
047	B1-L	Tuner VHF1 Boundary Low Byte	0..255	32

B2-H

S-No	OSD	Description	MinMax	Def.
048	B2-H	Tuner VHF3 Boundary High Byte	0..255	30

B2-L

S-No	OSD	Description	MinMax	Def.
049	B2-L	Tuner VHF3 Boundary Low Byte	0..255	2

FRAV

S-No	OSD	Description	MinMax	Def.
050	FRAV	Peaking center frequency for AV	0..3	0

YSCM

S-No	OSD	Description	MinMax	Def.
051	YSCM	Y-delay adjustment for SECAM	0..15	12

YNTS

S-No	OSD	Description	MinMax	Def.
052	YNTS	Y-delay adjustment for NTSC	0..15	2

YPAL

S-No	OSD	Description	MinMax	Def.
053	YPAL	Y-delay adjustment for PAL	0..15	2

YAV1

S-No	OSD	Description	MinMax	Def.
054	YAV1	Y-delay adjustment for AV-1	0..15	4

YAV2

S-No	OSD	Description	MinMax	Def.
055	YAV2	Y-delay adjustment for AV-2	0..15	4

Y_S1

S-No	OSD	Description	MinMax	Def.
056	Y_S1	Y-delay adjustment for S-VHS-1	0..15	4

Y_S2

S-No	OSD	Description	MinMax	Def.
057	Y_S2	Y-delay adjustment for S-VHS-2	0..15	4

COMB

S-No	OSD	Description	MinMax	Def.
058	COMB	Comb filter mode	comb filter active 1 comb filter not active 0	Depends on the chassis selected.

BLUBKG

S-No	OSD	Description	MinMax	Def.
060	BLUBKG	Determines background colour and mute option	0 = No Mute 1 = Black Mute 2 = Blue Mute	Blue Mute

NOMT

S-No	OSD	Description	MinMax	Def.
061	NOMT	Enables Blue mute when BLUBKG disabled user item for the menu	0 = No Mute 1 = Blue Mute	

BLCS

S-No	OSD	Description	MinMax	Def.
062	BLCS	Adjusts Black stretch functions	0 = Disable 1 = Enable	0

BLUS

S-No	OSD	Description	MinMax	Def.
063	BLUS	Adjusts Black stretch functions	0 = Disable 1 = Enable	1

WHTS

S-No	OSD	Description	MinMax	Def.
064	WHTS	Adjusts Black stretch functions	0..3	3

CLPR

S-No	OSD	Description	MinMax	Def.
065	CLPR	Soft Clipping Level	0..3	3

OVSH

S-No	OSD	Description	MinMax	Def.
066	OVSH	Adjusts peaking ratio	0..3	0

TNTD

S-No	OSD	Description	MinMax	Def.
067	TNTD	Default base band tint value	0..63	32

SVMA

S-No	OSD	Description	MinMax	Def.
068	SVMA	Scan Velocity Modulation output signal	600 mV p-p 1200 mV p-p	0

SVM

S-No	OSD	Description	MinMax	Def.
069	SVM	Delay of RGB output to SVM output	00 ns; 25 ns; 50 ns; 75 ns; 100 ns; 125 ns; 150 ns; 175 ns	100 ns

VMA

S-No	OSD	Description	MinMax	Def.
070	VMA	Amplitude of SVM output	0:Off 1:0.8 Vp-p 2:1.2 Vp-p 3:1.8 Vp-p	1.2 Vp-p

SMD

S-No	OSD	Description	MinMax	Def.
071	SMD	Scan velocity Modulation mode	0:Off 1:Video 2:TXT/OSD 3:Video/OSD	Video/OSD

SOPW

S-No	OSD	Description	MinMax	Def.
072	SOPW	SCAVEM (Scan Velocity Modulator) text signal pulse width	0..3	3

SOTM

S-No	OSD	Description	MinMax	Def.
073	SOTM	SCAVEM (Scan Velocity Modulator) text output to Video processor earlier than R,G and B signals	0..7	7

WPRC

S-No	OSD	Description	MinMax	Def.
074	WPRC	White point Red for Cold	0..63	32

WPGC

S-No	OSD	Description	MinMax	Def.
075	WPGC	White point Green for Cold	0..63	32

WPBC

S-No	OSD	Description	MinMax	Def.
076	WPBC	White point Blue for Cold	0..63	31

BLORC

S-No	OSD	Description	MinMax	Def.
077	BLORC	Black level offset Red for Cold	0..63	33

BLOGC

S-No	OSD	Description	MinMax	Def.
078	BLOGC	Black level offset Green for Cold	0..63	33

WPRN

S-No	OSD	Description	MinMax	Def.
079	WPRN	White point Red for Normal	0..63	37

WPGN

S-No	OSD	Description	MinMax	Def.
080	WPGN	White point Green fpr Normal	0..63	32

WPBN

S-No	OSD	Description	MinMax	Def.
081	WPBN	White point Blue for Normal	0..63	19

BLORN

S-No	OSD	Description	MinMax	Def.
082	BLORN	Black level offset Red for Normal	0..63	33

BLOGN

S-No	OSD	Description	MinMax	Def.
083	BLOGN	Black level offset Green for Normal	0..63	33

WPRW

S-No	OSD	Description	MinMax	Def.
084	WPRW	White point Red for Warm	0..63	49

WPGW

S-No	OSD	Description	MinMax	Def.
085	WPGW	White point Green for Warm	0..63	40

WPBW

S-No	OSD	Description	MinMax	Def.
086	WPBW	White point Blue for Warm	0..63	25

BLORW

S-No	OSD	Description	MinMax	Def.
087	BLORW	Black level offset Red for Warm	0..63	33

BLOGW

S-No	OSD	Description	MinMax	Def.
088	BLOGW	Black level offset Green for Warm	0..63	33

OSO

S-No	OSD	Description	MinMax	Def.
089	OSO	Switch-off in vertical overscan	On/Off	On

FSL

S-No	OSD	Description	MinMax	Def.
090	FSL	Forced slicing level for vertical sync	0..1	0

MUS

S-No	OSD	Description	MinMax	Def.
091	MUS	NTSC Matrix position	Japan USA	Japan

PWL

S-No	OSD	Description	MinMax	Def.
092	PWL	Peak White limiting	0..15	8

BPS

S-No	OSD	Description	MinMax	Def.
093	BPS	Bypass chroma temel-band	On/Off	On

CLPL

S-No	OSD	Description	MinMax	Def.
094	CLPL	Soft Climping level	0% above PWL level 5% above PWL level 10% above PWL level soft clipping off	10% above PWL level

CL

S-No	OSD	Description	MinMax	Def.
095	CL	Cathode drive level	0..15	8

AKB

S-No	OSD	Description	MinMax	Def.
096	AKB	Black current stabilization	On/Off	On

EVG

S-No	OSD	Description	MinMax	Def.
097	EVG	Enable vertical guard (RGB blanking)	On/Off	Off

OSVE

S-No	OSD	Description	MinMax	Def.
098	OSVE	the black current measuring lines in the overscan	Enable Disable	Enable

COR

S-No	OSD	Description	MinMax	Def.
099	COR	Coring	0..3	2

WSS

S-No	OSD	Description	MinMax	Def.
101	WSS	Wide screen signalling	0 = Disable 1 = Enable	1

GSCRT

S-No	OSD	Description	MinMax	Def.
102	GSCRT	Golden scart (activate zoom accordingly pin8)	0 = Disable 1 = Enable	1

AV2SI

S-No	OSD	Description	MinMax	Def.
103	AV2SI	Enable/disable AV2S	0 = Disable 1 = enable	1

AV3I

S-No	OSD	Description	MinMax	Def.
104	AV3I	Enable/disable AV3	0 = Disable 1 = enable	0

FAVI

S-No	OSD	Description	MinMax	Def.
105	FAVI	Enable/disable Front AV	0 = Disable 1 = Enable	1

BAVI

S-No	OSD	Description	MinMax	Def.
106	BAVI	Enable/disable BAV		0

VESI

S-No	OSD	Description	MinMax	Def.
107	VESI	Enable/disable Vesbus		0

FSVI

S-No	OSD	Description	MinMax	Def.
108	FSVI	Enable/disable FAV-S	0:Disable Front SVHS if Op_SVHS is enabled 1:Enable Front SVHS if Op_SVHS is enabled	0

BSVI

S-No	OSD	Description	MinMax	Def.
109	BSVI	Enable/disable BAV-S	0:Disable Back SVHS if Op_SVHS is enabled 1:Enable Back SVHS if Op_ SVHS is enabled	0

DVDI

S-No	OSD	Description	MinMax	Def.
110	DVDI	Enable/disable DVD	0..1	1

SSTDBG

S-No	OSD	Description	MinMax	Def.
111	SSTDBG	Enable/disable Sound Standard BG	0..1	1

SSTDI

S-No	OSD	Description	MinMax	Def.
112	SSTDI	Enable/disable Sound Standard I	0..1	1

SSTDDK

S-No	OSD	Description	MinMax	Def.
113	SSTDDK	Enable/disable Sound Standard DK	0..1	1

SSTDDL

S-No	OSD	Description	MinMax	Def.
114	SSTDL	Enable/disable Sound Standard L	0..1	1

CNFG

S-No	OSD	Description	MinMax	Def.
115	CNFG	No Audio SSD functions only Mono	0 = Mono	2
		All Audio SSD except stereo decoder	1 = AV-Stereo	
		All Audio SSD functions	2 = Stereo	

CMUTE

S-No	OSD	Description	MinMax	Def.
116	CMUTE	Enable/disable mute when no audio carrier		132

BLNG

S-No	OSD	Description	MinMax	Def.
117	BLNG	Adjusts Bi-Language for Mono and AV stereo	0 = Disable 1 = Enable	0

OPHP

S-No	OSD	Description	MinMax	Def.
119	OPHP	Adjusts Headphone options	0 = Disable 1 = Enable	0

OPEQ

S-No	OSD	Description	MinMax	Def.
120	OPEQ	Adjusts Equalizer functions	0 = Disable 1 = Enable	0

DLBY

S-No	OSD	Description	MinMax	Def.
121	DLBY	Adjusts Dolby modes	0 =Disable 1 =Virtual Dolby Sur.422 2 =Virtual Dolby Sur.423 3 = Dolby Pro Logic için	0

OTRU

S-No	OSD	Description	MinMax	Def.
122	OTRU	Adjusts SRS Tru Surround	0 = Disable 1 = Enable	0

ODUB

S-No	OSD	Description	MinMax	Def
123	ODUB	Bass Management	0=OFF 1=DBEMainOn 2=DUBMainOn 3=DBESubWooferOn 4=DUBSubOn 5=BBEOn	0

AVLL

S-No	OSD	Description	MinMax	Def.
124	AVLL	AVL level	0..15	2

AVLW

S-No	OSD	Description	MinMax	Def.
125	AVLW	AVL weight	0..1	0

AVLM

S-No	OSD	Description	MinMax	Def.
126	AVLM	AVL decay time	0..5	3

OPAVL

S-No	OSD	Description	MinMax	Def.
127		OPAVL	0..1	1

AVL

S-No	OSD	Description	MinMax	Def.
128	AVL	AVL is OFF/ON	0..1	1

DECL

S-No	OSD	Description	MinMax	Def.
129	DECL	FM Stereo decoder output level adjust	0..31	15

MNLV

S-No	OSD	Description	MinMax	Def.
130	MNLV	Mono output level adjust	0..31	15

ADCAM

S-No	OSD	Description	MinMax	Def.
131	ADCAM	Audio ADC Level for Secam AM	0..31	10

ADCAV

S-No	OSD	Description	MinMax	Def.
132	ADCAV	Audio ADC Level for AV	0..31	13

NICL

S-No	OSD	Description	MinMax	Def.
133	NICL	Nicam output level adjust	0..31	15

AV1 PRESCL

S-No	OSD	Description	MinMax	Def.
134	AV1 PRESCL	External AM level adjust	0..31	15

AV2 PRESCL

S-No	OSD	Description	MinMax	Def.
135	AV2 PRESCL	External AV level adjust	0..31	15

E2D

S-No	OSD	Description	MinMax	Def.
136	E2D	Selection of audio output signal on AUDEEM pin 1	FE AV	FE

TXSPLT

S-No	OSD	Description	MinMax	Def.
137	TXSPLT	Select only Full screen or Split screen available	0 = Full screen 1 = Split screen	Split screen

TXHPOS

S-No	OSD	Description	MinMax	Def.
138	TXHPOS	Teletext Single page start point setting	0..63	0

TXEWW

S-No	OSD	Description	MinMax	Def.
139	TXEWW	Teletext East West Width	0..63	48

TXHPA

S-No	OSD	Description	MinMax	Def.
140	TXHPA	Teletext left Twin page start point setting	0..63	0

TXHPB

S-No	OSD	Description	MinMax	Def.
141	TXHPB	Teletext right Twin page start point setting	0..63	0

TXHBB

S-No	OSD	Description	MinMax	Def.
142	TXHBB	Teletext Right Box start point (for PAT)	0..127	73

PATVA

S-No	OSD	Description	MinMax	Def.
142	PATVA	PAT Vertical Amplitude	0..63	16

PATVZ

S-No	OSD	Description	MinMax	Def.
142	PATVZ	PAT Vertical Zoom	0..63	16

PATHS

S-No	OSD	Description	MinMax	Def.
142	PATHS	PAT Horiznatal Shift	0..63	32

TXTBRI

S-No	OSD	Description	MinMax	Def.
146	TXTBRI	Teletext Brightness	0..63	32

TXTCON

S-No	OSD	Description	MinMax	Def.
147	TXTCON	Unused	0..1	0

TXTRGB

S-No	OSD	Description	MinMax	Def.
148	TXRGB	Teletext Contrast	0..15	0

LSEL-1

S-No	OSD	Description	MinMax	Def.
149	LSEL-1	Available Language Selection	0..255	255

LSEL-2

S-No	OSD	Description	MinMax	Def.
150	LSEL-2	Available Language Selection	0..31	31

TSLP

S-No	Description	MinMax	Def.
151	Enable/disable Sleep Timer	0 = Disable 1 = Enable	1

TREM

S-No	OSD	Description	MinMax	Def.
152	TREM	Enable/disable Timer (UNUSED)	0 = Disable 1 = Enable	Depends on the chassis selected

TSW

S-No	OSD	Description	MinMax	Def.
153	TSW	Enable/disable Switch over Timer (UNUSED)	0 = Disable 1 = Enable	Depends on the chassis selected

TOFF

S-No	OSD	Description	MinMax	Def.
154	TOFF	Enable/disable Switch Off Timer (UNUSED)	0 = Disable 1 = Enable	Depends on the chassis selected

TSKP

S-No	OSD	Description	MinMax	Def.
155	TSKP	Enable/disable Commercial skip Timer (UNUSED)	0 = Disable 1 = Enable	Depends on the chassis selected

TRT

S-No	OSD	Description	MinMax	Def.
156	TRT	Enable/disable Real-time Clock (UNUSED)	0 = Disable 1 = Enable	Depends on the chassis selected

PWPRF

S-No	OSD	Description	MinMax	Def.
157	PWPRF	The startup behaviour can be aligned between fast startup and perfect startup.	0 = Fast 15 = Perfect	Perfect

PWRES

S-No	OSD	Description	MinMax	Def.
158	PWRES	Enabled: The TV will be restored to the last state at power on. Disabled: The state at power on will always be STANDBY.	0 = Disable 1 = Enable	Enable

PWON

S-No	OSD	Description	MinMax	Def.
159	PWON	The number of keys to switch from STANDBY to POWERON.	0 = STANDBY and SERVICE 1 = UP/DOWN, Digits 0 – 9, STANDBY and SERVICE	Digits 0–9, STANDBY SERVIS

DCXO

S-No	OSD	Description	MinMax	Def.
160	DCXO	DCXO adjustment	0..127	79

DCXOA

S-No	OSD	Description	MinMax	Def.
161	DCXOA	Automatic DCXO adjustment	On/Off	Off

SSL

S-No	OSD	Description	MinMax	Def.
162	SSL	Slicing Level Sync Separator	0..1	1

PVBRMV

S-No	OSD	Description	MinMax	Def.
163	PVBRMV	Preset Video Movie Brightness	0..63	32

PVCTMV

S-No	OSD	Description	MinMax	Def.
164	PVCTMV	Preset Video Movie Contrast	0..63	32

PVCLMV

S-No	OSD	Description	MinMax	Def.
165	PVCLMV	Preset Video Movie Colour	0..63	32

PVSHMV

S-No	OSD	Description	MinMax	Def.
166	PVSHMV	Preset Video Movie Sharpness	0..63	32

PVBRSP

S-No	OSD	Description	MinMax	Def.
167	PVBRSP	Preset Video Sports Brightness	0..63	32

PVCTSP

S-No	OSD	Description	MinMax	Def.
168	PVCTSP	Preset Video Sports Contrast	0..63	32

PVCLSP

S-No	OSD	Description	MinMax	Def.
169	PVCLSP	Preset Video Sports Colour	0..63	32

PVSHSP

S-No	OSD	Description	MinMax	Def.
170	PVSHSP	Preset Video Sports Sharpness	0..63	32

PVBRWK

S-No	OSD	Description	MinMax	Def.
171	PVBRWK	Preset Video Weak Brightness	0..63	32

PVCTWK

S-No	OSD	Description	MinMax	Def.
172	PVCTWK	Preset Video Weak Contrast	0..63	32

PVCLWK

S-No	OSD	Description	MinMax	Def.
173	PVCLWK	Preset Video Weak Colour	0..63	32

PVSHWK

S-No	OSD	Description	MinMax	Def.
174	PVSHWK	Preset Video Weak Sharpness	0..63	32

PABAVO

S-No	OSD	Description	MinMax	Def.
175	PABAVO	Preset Audio Voice Bass	0..63	32

PATRVO

S-No	OSD	Description	MinMax	Def.
176	PATRVO	Preset Audio Voice Treble	0..63	15

PAB1VO

S-No	OSD	Description	MinMax	Def.
177	PAB1VO	Preset Audio Voice Equalizer Band 1	0..63	20

PAB2VO

S-No	OSD	Description	MinMax	Def.
178	PAB2VO	Preset Audio Voice Equalizer Band 2	0..63	40

PAB3VO

S-No	OSD	Description	MinMax	Def.
179	PAB3VO	Preset Audio Voice Equalizer Band 3	0..63	50

PAB4VO

S-No	OSD	Description	MinMax	Def.
180	PAB4VO	Preset Audio Voice Equalizer Band 4	0..63	40

PAB5VO

S-No	OSD	Description	MinMax	Def.
181	PAB5VO	Preset Audio Voice Equalizer Band 5	0..63	20

PABAMU

S-No	OSD	Description	MinMax	Def.
182	PABAMU	Preset Audio Music Bass	0..63	39

PATRMU

S-No	OSD	Description	MinMax	Def.
183	PATRMU	Preset Audio Music Treble	0..63	34

PAB1MU

S-No	OSD	Description	MinMax	Def.
184	PAB1MU	Preset Audio Music Equalizer Band 1	0..63	40

PAB2MU

S-No	OSD	Description	MinMax	Def.
185	PAB2MU	Preset Audio Music Equalizer Band 2	0..63	50

PAB3MU

S-No	OSD	Description	MinMax	Def.
186	PAB3MU	Preset Audio Music Equalizer Band 3	0..63	55

PAB4MU

S-No	OSD	Description	MinMax	Def.
187	PAB4MU	Preset Audio Music Equalizer Band 4	0..63	60

PAB5MU

S-No	OSD	Description	MinMax	Def.
188	PAB5MU	Preset Audio Music Equalizer Band 5	0..63	63

PABATH

S-No	OSD	Description	MinMax	Def.
189	PABATH	Preset Audio Theatre Bass	0..63	34

PATRTH

S-No	OSD	Description	MinMax	Def.
190	PATRTH	Preset Audio Theatre Treble	0..63	36

PAB1TH

S-No	OSD	Description	MinMax	Def.
191	PAB1TH	Preset Audio Theatre Equalizer Band 1	0..63	30

PAB2TH

S-No	OSD	Description	MinMax	Def.
192	PAB2TH	Preset Audio Theatre Equalizer Band 2	0..63	55

PAB3TH

S-No	OSD	Description	MinMax	Def.
193	PAB3TH	Preset Audio Theatre Equalizer Band 3	0..63	63

PAB4TH

S-No	OSD	Description	MinMax	Def.
194	PAB4TH	Preset Audio Theatre Equalizer Band 4	0..63	50

PAB5TH

S-No	OSD	Description	MinMax	Def.
195	PAB5TH	Preset Audio Theatre Equalizer Band 5	0..63	40

PABASP

S-No	OSD	Description	MinMax	Def.
196	PABASP	Preset Audio Speech Bass	0..63	34

PTRSP

S-No	OSD	Description	MinMax	Def.
197	PTRSP	Preset Audio Speech Treble	0..63	36

PAB1SP

S-No	OSD	Description	MinMax	Def.
198	PAB1SP	Preset Audio Speech Equalizer Band 1	0..63	36

PAB2SP

S-No	OSD	Description	MinMax	Def.
199	PAB2SP	Preset Audio Speech Equalizer Band 2	0..63	44

PAB3SP

S-No	OSD	Description	MinMax	Def.
200	PAB3SP	Preset Audio Speech Equalizer Band 3	0..63	44

PAB4SP

S-No	OSD	Description	MinMax	Def.
201	PAB4SP	Preset Audio Speech Equalizer Band 4	0..63	40

PAB5SP

S-No	OSD	Description	MinMax	Def.
202	PAB5SP	Preset Audio Speech Equalizer Band 5	0..63	24

CTI1

S-No	OSD	Description	MinMax	Def.
206	CTI1	First control byte for CTI	0..255	32

CTI2

S-No	OSD	Description	MinMax	Def.
207	CTI2	Second control byte for CTI	0..255	8

CTI3

S-No	OSD	Description	MinMax	Def.
208	CTI3	Third control byte for CTI	0..255	228

P BS1

S-No	OSD	Description	MinMax	Def.
209	P BS1	PIP Tuner Band VHF1	0..15	1

P BS2

S-No	OSD	Description	MinMax	Def.
210	P BS2	PIP Tuner Band VHF3	0..15	2

P BS3

S-No	OSD	Description	MinMax	Def.
211	P BS3	PIP Tuner Band UHF	0..15	4

P CB

S-No	OSD	Description	MinMax	Def.
212	P CB	Control byte for PIP Tuner	0..255	142

P B1H

S-No	OSD	Description	MinMax	Def.
213	P B1H	PIP Tuner VHF1 Boundary High Byte	0..255	12

P B1L

S-No	OSD	Description	MinMax	Def.
214	P B1L	PIP Tuner VHF1 Boundary Low Byte	0..255	32

P B2H

S-No	OSD	Description	MinMax	Def.
215	P B2H	PIP Tuner VHF3 Boundary High Byte	0..255	30

P B2L

S-No	OSD	Description	MinMax	Def.
216	P B2L	PIP Tuner VHF3 Boundary Low Byte	0..255	2

P BRI

S-No	OSD	Description	MinMax	Def.
217	P BRI	PIP IC Brightness	0..15	7

P CON

S-No	OSD	Description	MinMax	Def.
218	P CON	PIP IC Contrast	0..15	10

P AGC

S-No	OSD	Description	MinMax	Def.
219	P AGC	PIP IF AGC	0..255	23

P YPAL

S-No	OSD	Description	MinMax	Def.
220	P YPAL	Y Delay for PIP	0..15	0

P YSCM

S-No	OSD	Description	MinMax	Def.
221	P YSCM	Y delay SECAM for PIP	0..15	0

NICAM

S-No	OSD	Description	MinMax	Def.
222	NICAM	NICAM stereo ON/ OFF	ON / OFF	1

WPR-RGB

S-No	OSD	Description	MinMax	Def.
229	WPR-RGB	White point Red offset for RGB	0..63	32

WPG-RGB

S-No	OSD	Description	MinMax	Def.
230	WPG-RGB	White point Green offset for RGB	0..63	40

WPB-RGB

S-No	OSD	Description	MinMax	Def.
231	WPB-RGB	White point Blue offset for RGB	0..63	32

V-3D

S-No	OSD	Description	MinMax	Def.
232	V-3D	Virtual Dolby		

MAXCOL

S-No	OSD	Description	MinMax	Def.
233	MAXCOL	MAX allowed user colour	0..63	45

MAXBRI

S-No	OSD	Description	MinMax	Def.
234	MAXBRI	MAX allowed user brightness	0..63	45

MAXCON

S-No	OSD	Description	MinMax	Def.
235	MAXCON	MAX allowed user contrast	0..63	28

SAVEFS

S-No	OSD	Description	MinMax	Def.
236	SAVEFS	Save to factory settings from MENU	0..1	0

LOADFS

S-No	OSD	Description	MinMax	Def.
237	LOADFS	Load factory setting to MENU	0..1	0

5. MENU LANGUAGE TABLE

	English	German	French	Spanish	Portuguese	Italian	Swedish
Group 1 WEST	1	1	1	1	1	1	1
Group 2 EAST	1	1	1	0	0	0	0
Group 3 ARABIC	1	1	1	0	0	0	0
Group 4 IDTV	1	1	1	1	0	1	1

	Turkish	Hungary	Czech	Polish	Croatian	Rumanian	Dutch
Group 1 WEST	1	0	0	0	0	0	1
Group 2 EAST	0	1	1	1	1	1	0
Group 3 ARABIC	1	0	0	0	0	0	0
Group 4 IDTV	0	0	0	0	0	0	0

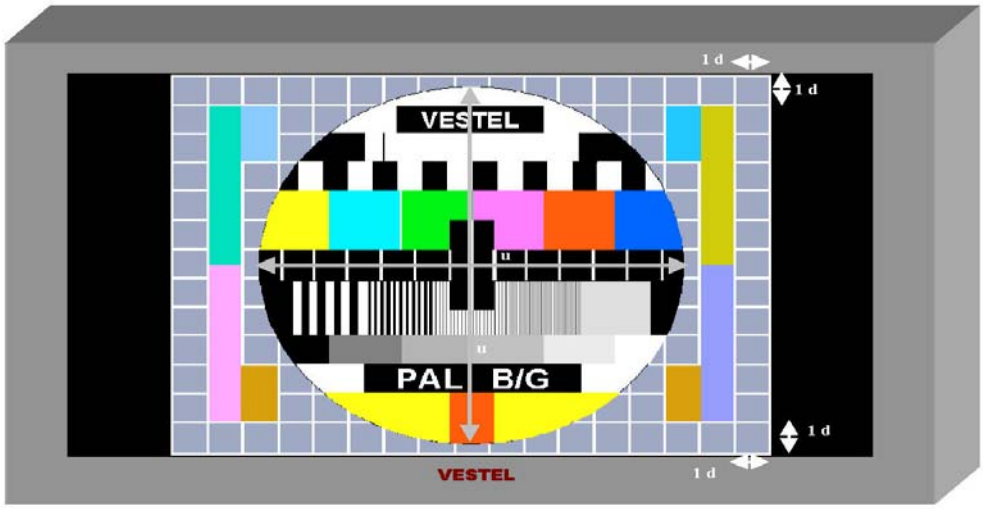
	Finnish	Slovakian	Slovenian	Bulgarian	Russian	Hebrew	Arabian
Group 1 WEST	1	0	0	0	0	0	0
Group 2 EAST	0	1	1	1	1	0	0
Group 3 ARABIC	0	0	0	0	1	1	1
roup 4 IDTV	1	0	0	0	0	0	0

	Greek	Ukrainian	Danish	Norwegian	Persian
Group 1 WEST	1	0	1	1	0
Group 2 EAST	0	1	0	0	0
Group 3 ARABIC	0	1	0	0	1
Group 4 IDTV	0	0	1	0	0

6. PICTURE MODES

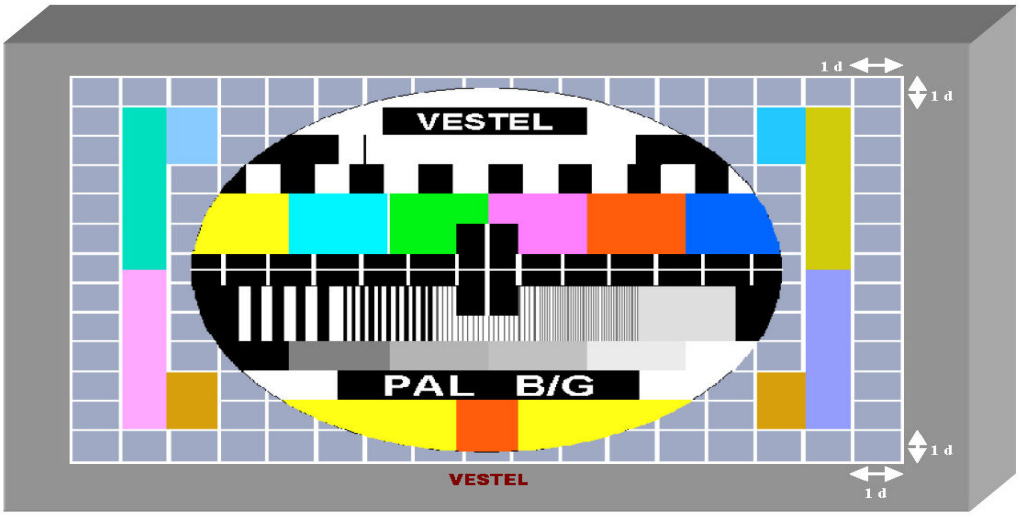
16:9 FORMATS

4:3 MODE



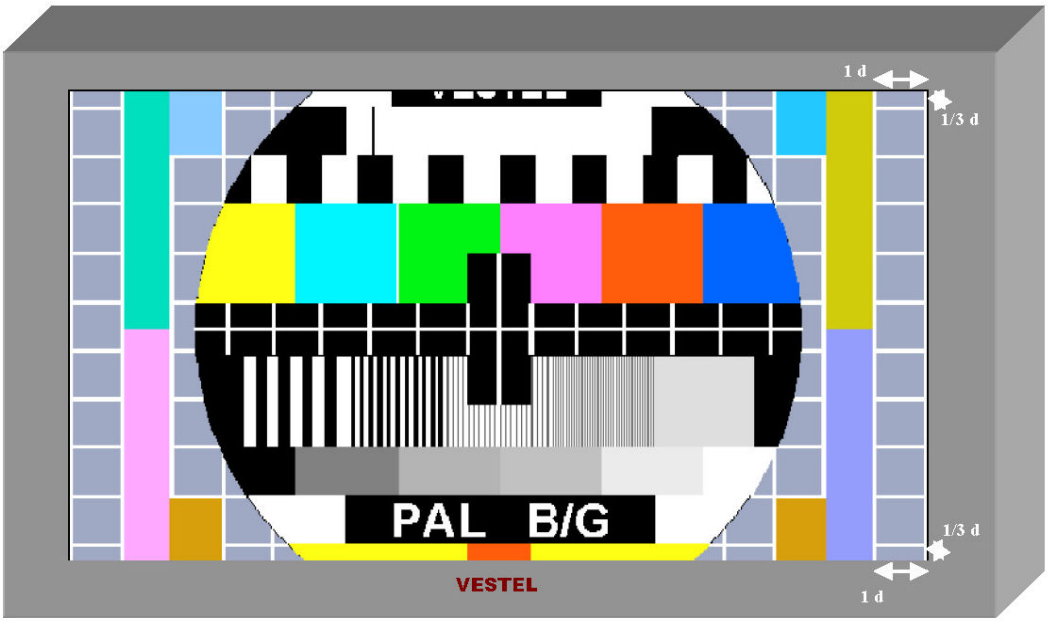
16:9 FORMATS

16:9 MODE



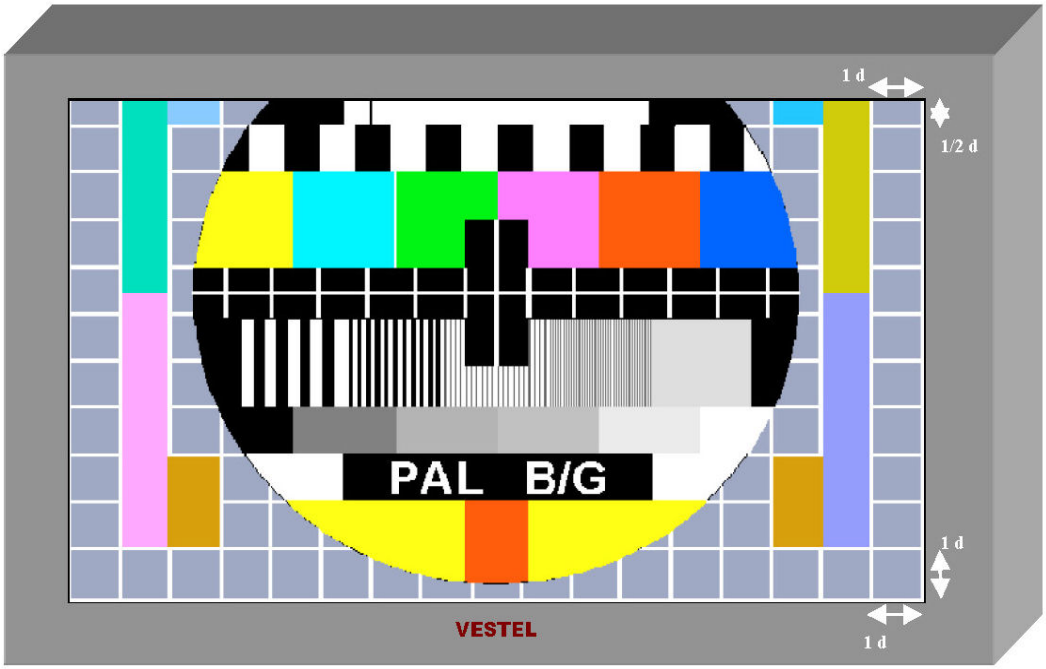
16:9 FORMATS

CINEMA MODE



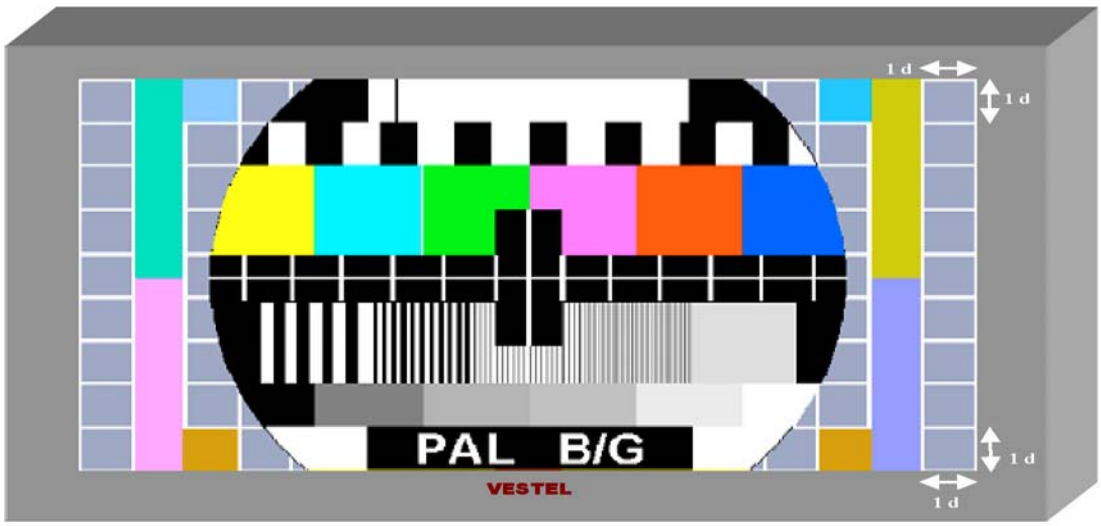
16:9 FORMATS

SUBTITLE MODE



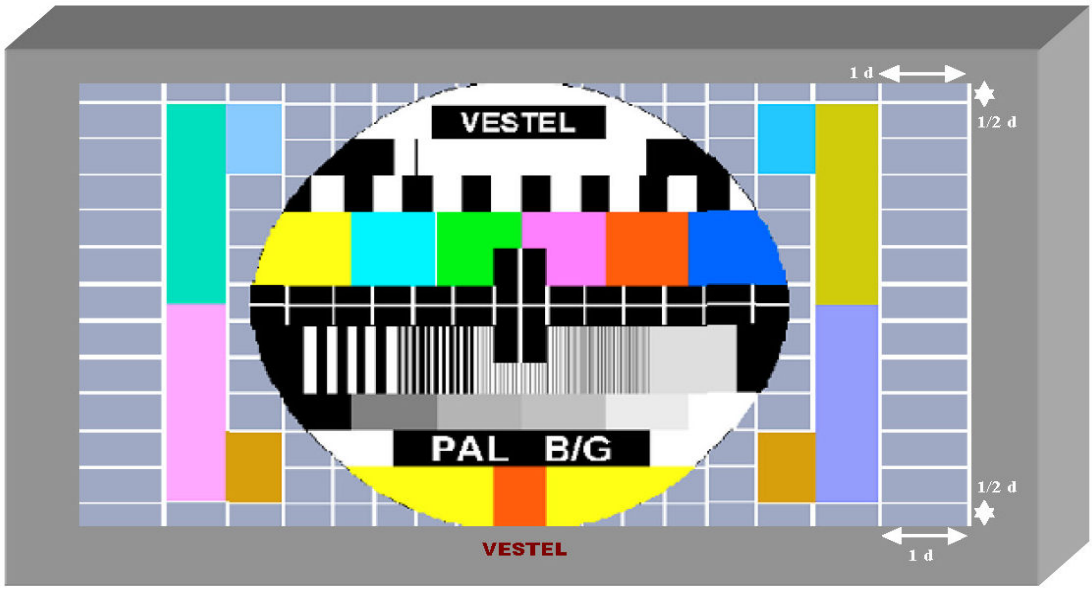
16:9 FORMATS

ZOOM MODE



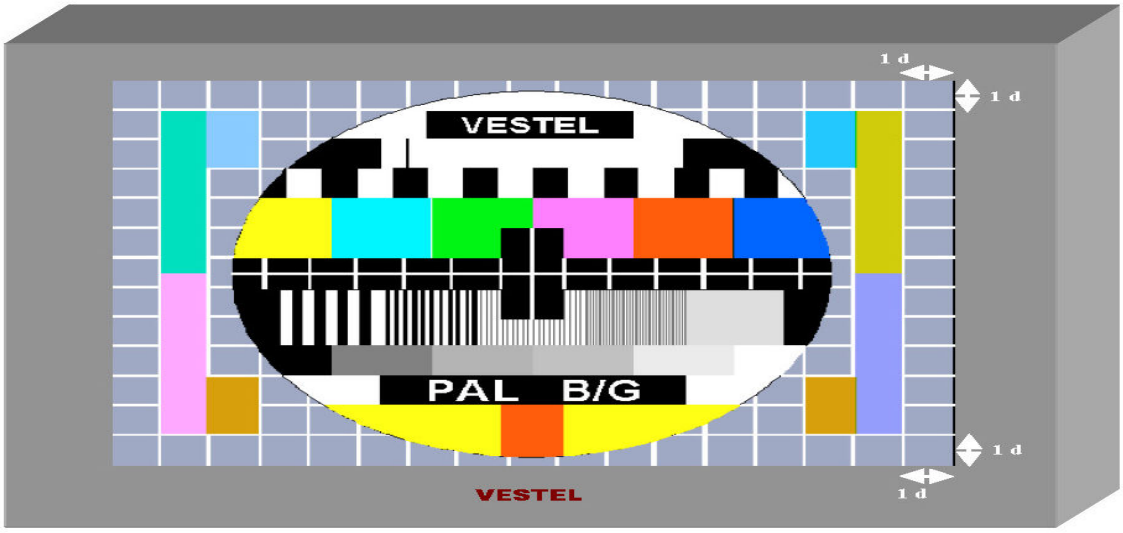
16:9 FORMATS

PANAROMIC MODE



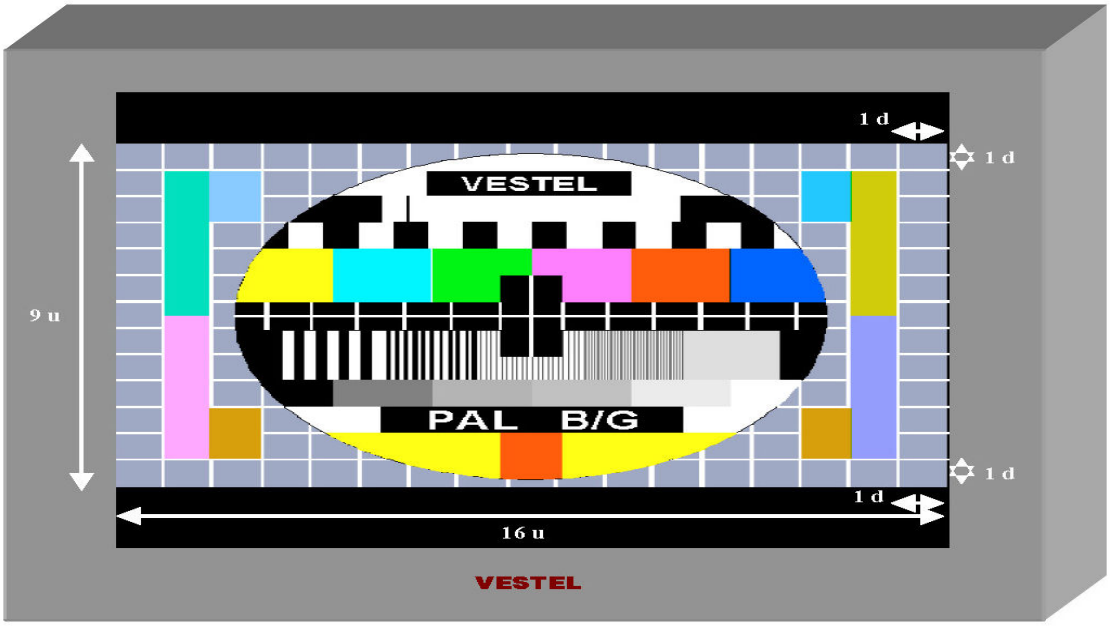
4:3 FORMATS

4:3 MODE

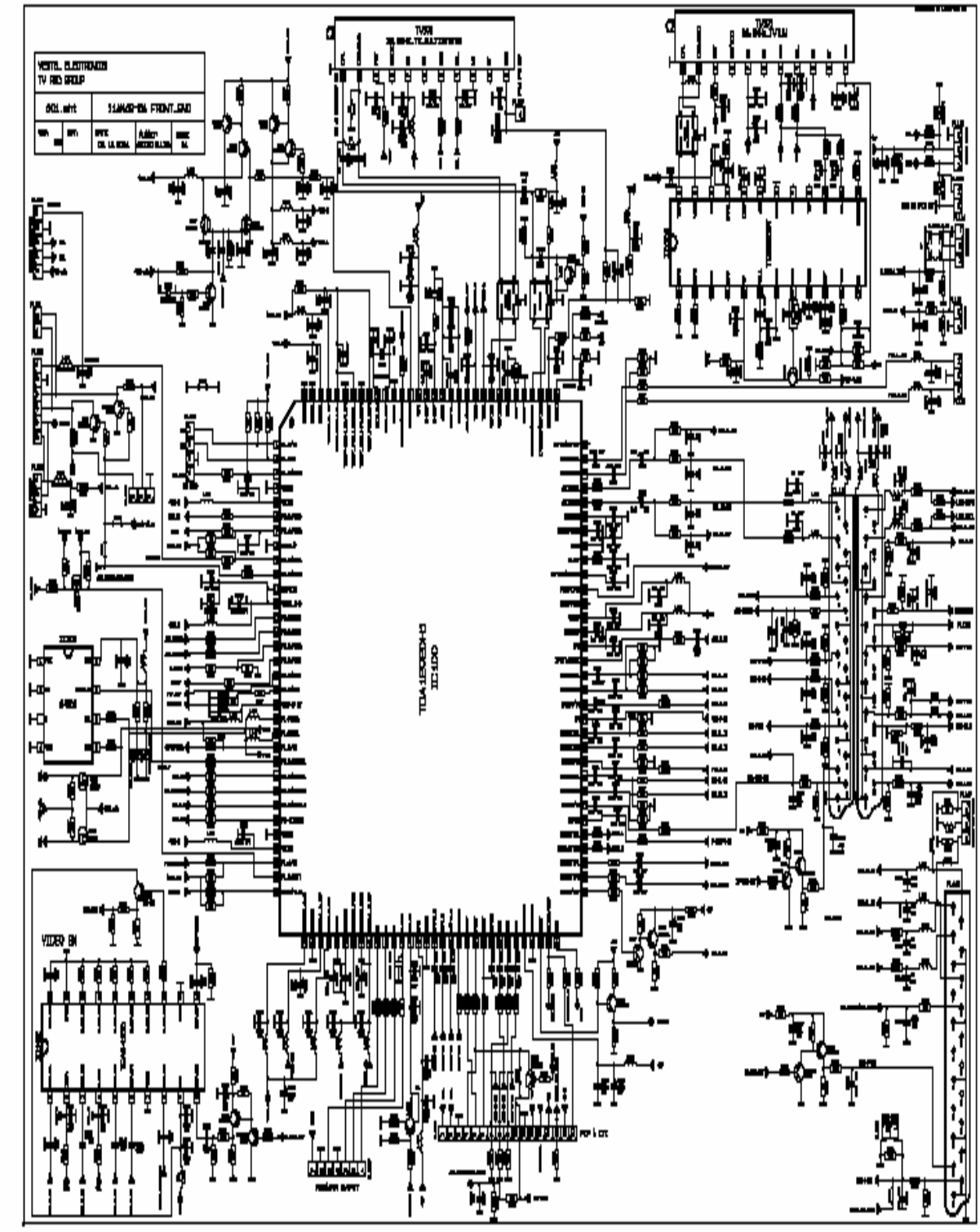


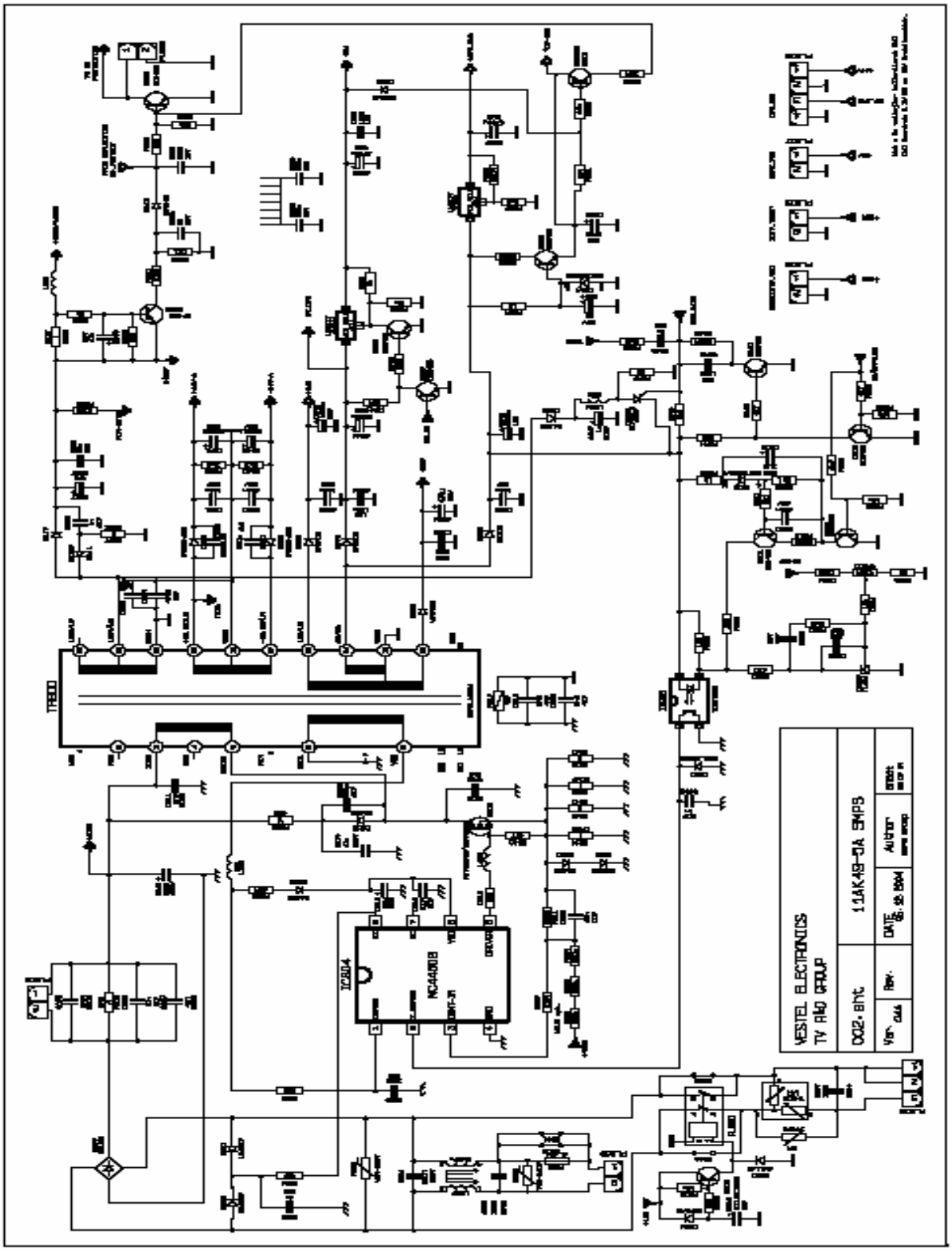
4:3 FORMATS

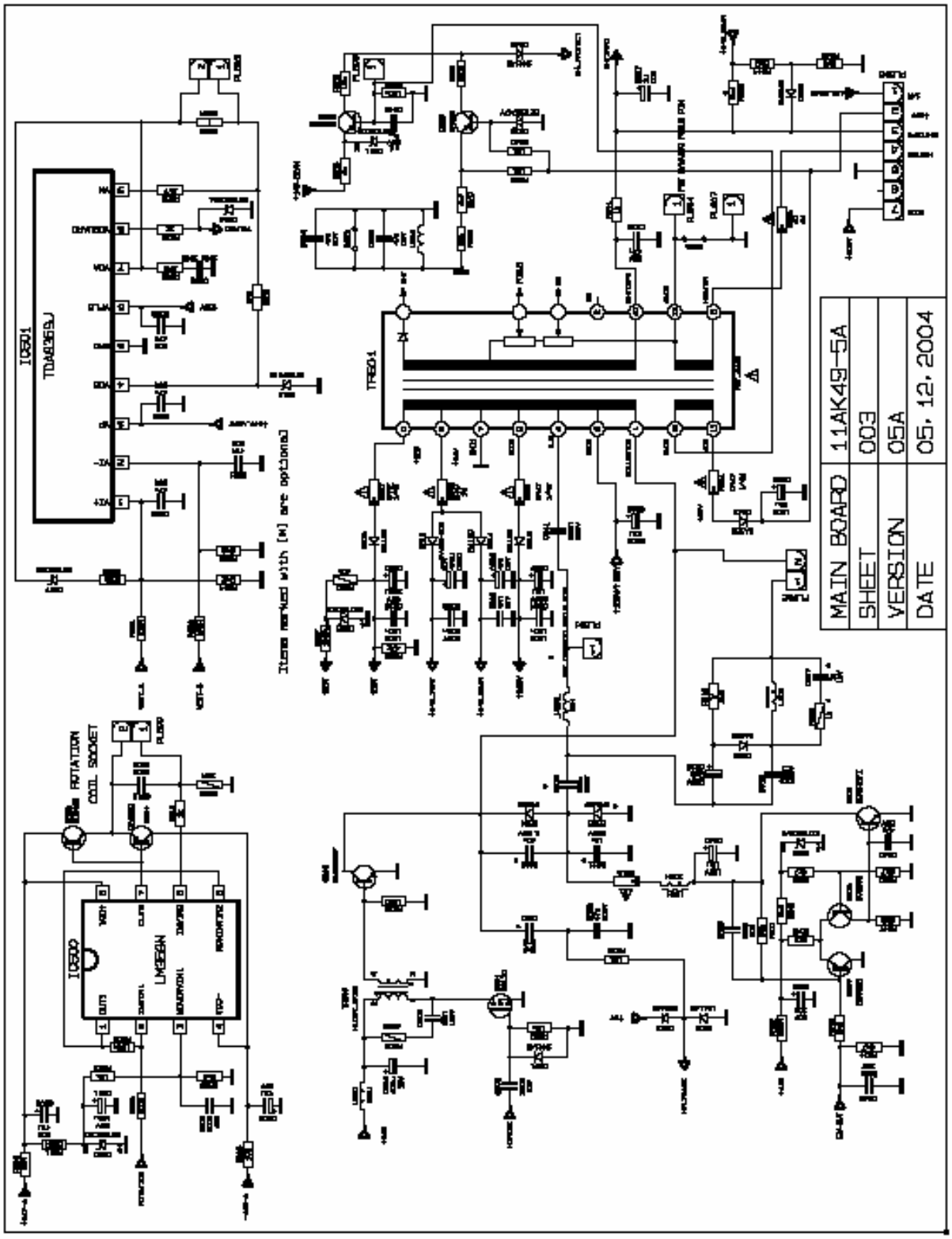
16:9 MODE

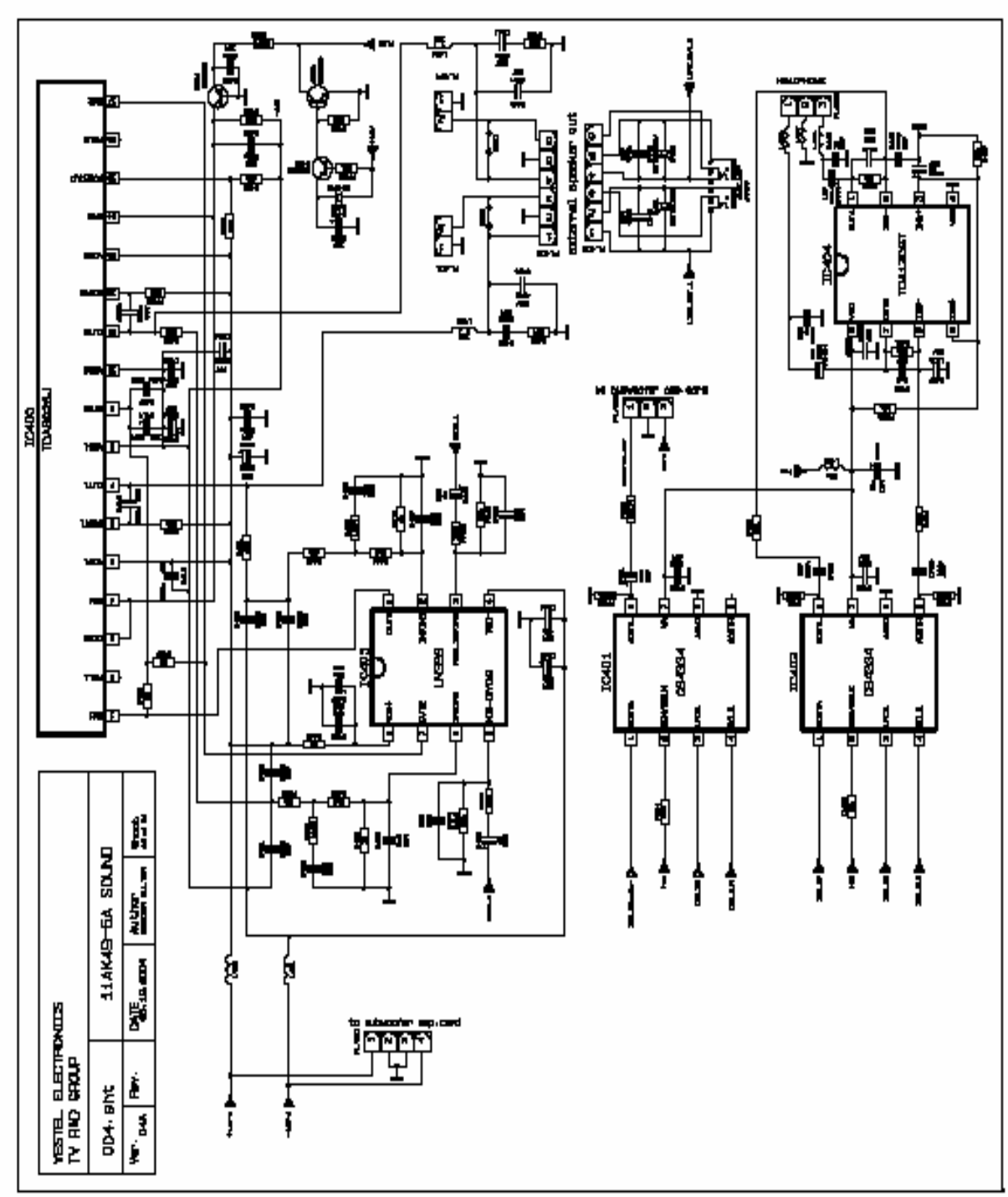


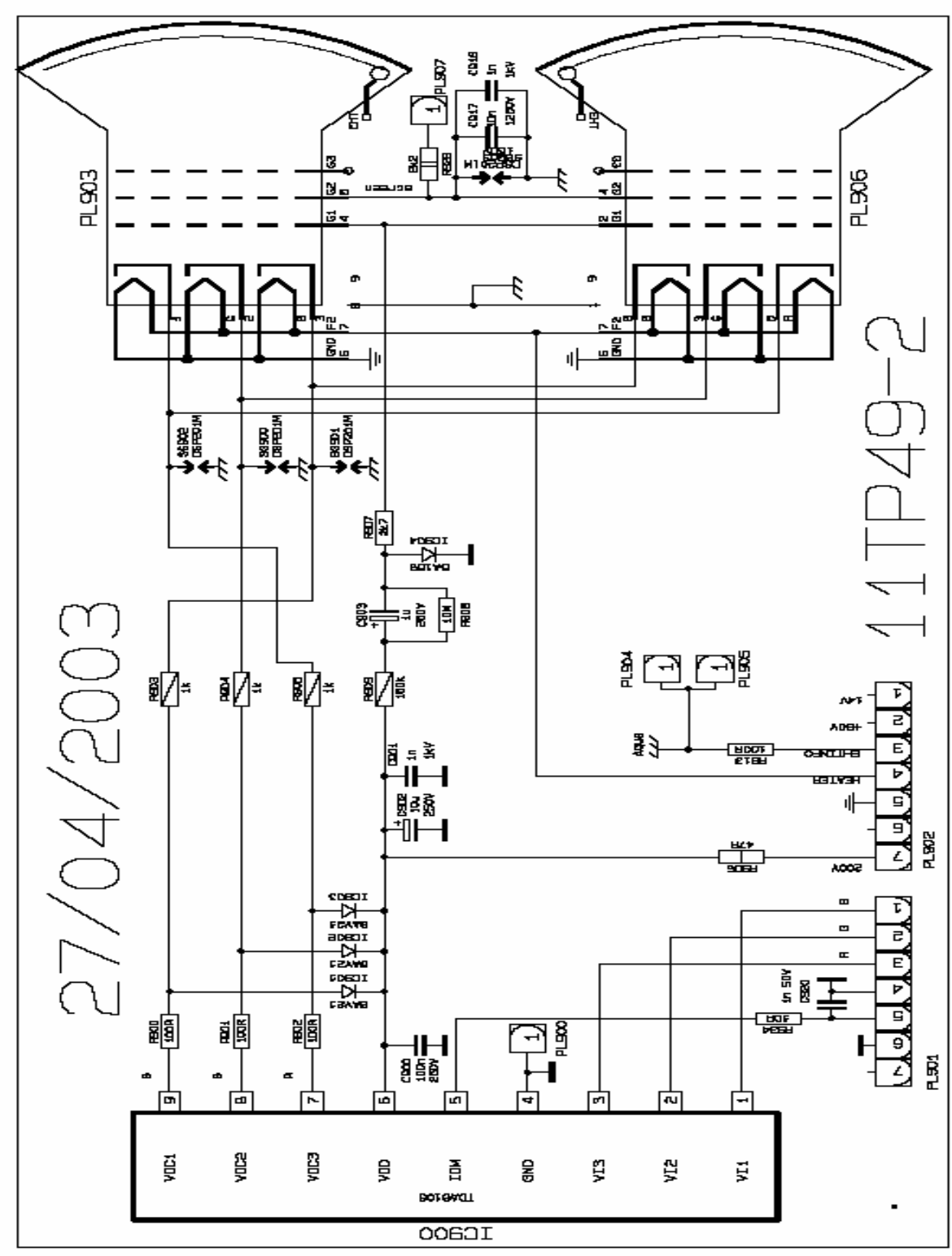
7.CIRCUIT DIAGRAMS




VESTEL ELECTRONICS
TV R&D GROUP
11AK43-01A SMPS


MAIN BOARD 11AK49-5A
SHEET 003
VERSION 05A
DATE 05. 12. 2004
Items marked with [*] are optional
IC501
TDA8395J
TR501
IC502
LM1881N
ROTATION COIL SOCKET


VESTEL ELECTRONICS
TV AND GROUP
114K49-6A SOUND


27/04/2003
11TP49-2
PL903
PL906
PL902
PL901
PL900
PL904
PL905
IC900
TDA6108
VDC1
VDC2
VDC3
VDD
IDM
GND
VI3
VI2
VI1
HEATER
200V

8 APPENDIX

a. DEFINITIONS, ACRONYMS AND ABBREVIATIONS

2CS	Dual Carrier Stereo a.k.a. German Stereo.
ACI	Automatic Channel Installation,
ACL	Automatic Colour Limiting
ADC	Analogue to Digital Converter
AF	Audio Frequency
AFC	Automatic Frequency Control
AGC	Automatic Gain Control
AKB	Auto Kine Biasing
API	Application Programmers Interface.
ASD	Automatic Standard Detection
ASP	Audio Signal Processor (on Picasso)
ATS	Automatic Tuning System,
AV	External Audio and Video TV peripheral.
AVC	Audio Video Control
AVL	Automatic Volume Leveling
BBE	Bass enhancement licensed by BBE Inc.
BE	Back-End
BKS	BlacK Stretch
BTSC	Broadcast Television Systems Committee USA standard
CC	Closed Captioning.
CCC	Continuous Cathode Calibration
CE	Configuration Element
CLUT	Colour Look Up Table
COR	Contrast Reduction
CVBS	Combined Video, Blanking and Sync.
DAC	Digital to Analogue Converter
DBE	Dynamic Bass Enhancement
DDEP	DEMDEC Easy Programming; operation mode of DEMDEC.
DEMDEC	Stereo demodulator decoder; part of ASP.
DPL	Dolby Pro Logic
DPTR	Data PoinTeR
DRCS	Dynamically Redefinable Character Set.
DSP	Digital Signal Processor (or Processing)
DUB	Dynamic Ultra Bass
EPG	Electronic Program Guide.
FA	Factory mode
FASTEXT	Special way of accessing teletext pages
FB	Fast Blanking
FE	Front End
FLOF	Full Level One Features (synonym for Fastext)
FST	Frequency Synthesis Tuning
GTV	Global TeleVision.
HP	Headphone

HSH	Horizontal Shift
IF	Intermediate Frequency. Normally the output of the tuner.
IIC	Inter Integrated Circuit
IIS	Inter Integrated Sound
LibCoMa	Library Configuration Manager.
LS	Loudspeaker
MIPS	Million Instructions Per Second
MPX	Japanese multiplexed sound standard
MS	Multi Standard
NICAM	Near Instantaneously Compacted Audio Multiplex.
NTSC	National Television System Committee. Colour encoding system.
NVM	Non-Volatile Memory
OSD	On Screen Display
OSRP	Overall System Realization Process
OTP	One Time Programmable
PAL	Phase Alternating LineColour encoding system.
PAT	Painter Authoring Tool. Development support tool to define Painter character sets (and UIMS data structures).
PB	Picture Booster
PIP	Picture In Picture
PLL	Phase Locked Loop
PMT	Power ManagemenT
PP	Personal Preferences
PS-MTS	Mainstream Television Solutions
PSW	Program Status Word
PWM	Pulse Width Modulation
RC-5	Remote Control system
RCP	Remote Control Preprocessor
RF	Radio Frequency TV signal broadcast.
RGB	Red, Green Blue. The colour signals.
Round-robin	A style of scheduling where each task is executed in turn, provided it is ready to run.
RPMS	Resource Persistent Memory Store
RTC	Real Time Clock
SAP	Second Audio Program; part of BTSC sound system.
SAW	Surface Acoustic Wave
SCART	External CVBS, S-VHS and Sound input/output, RGB and switching input.
SCI	Software Configuration Item
SCL	Serial Clock
SDA	Serial Data
SDE	Software Development Environment
SECAM	Sequentiel a Memoire Colour encoding system.
Set-maker	The manufacturer/developer of the end product.
SFR	Special Function Register.
SHLD	Software High Level Design
SIF	Sound Intermediate Frequency
SRT	Signal RouTing
SS	Source Switching

SSS	Static Standard Selection
State	The condition of a component that results in a particular observable behaviour.
Status Handler	A step that handles a status change, by managing the response to the change.
STB	SetTop Box
TOP(TEXT)	Table Of Pages, Special way of accessing teletext pages
TXT	Teletext
UHF	Ultra High Frequency
UI	User Interface
UIMS	User Interface Management System
UOC	Ultimate One Chip
User	See Set-maker
VDS	Virtual Dolby Surround
VG2	Voltage at Gate 2
VHF	Very High Frequency
VIF	Video Intermediate Frequency
VOD	Video On Demand
VPS	Video Programming delivery control System
VS	Vertical Slope
VSH	Vertical Shift
VSP	Video Signal Processor (on Cosmic)
VST	Voltage Synthesis Tuning
Y/C	Luminance/Chroma signal, S-VHS
YprPb	Luminance Y and colour difference signals (Pr - red, Pb - blue, colour bar 100% saturation)
YUV	Luminance (Y) and colour difference signals (U and V).

Audio Preset:	Pre-defined audio reproduction settings stored in NVM. The values of the items in a Preset can be set in service.
SCAVEM:	SCAn VElocity Modulation
User 1:	User defined setting for height of a 16:9 picture setting
User 2:	User defined setting for the zoom and the scroll of a 16:9 picture setting
Indicator:	An on screen object, giving textual or graphical information on user commands or system events .
NVM:	Non Volatile Memory, used to store user and service/factory settings
Program:	A broadcasted TV signal received via the tuner. A program can be identified by the frequency by which it is transmitted.
Source:	The selected input of the TV receiver. This can either be a the front end (i.e. a program) or an external AV source.
Video Preset:	Pre-defined video reproduction settings stored in NVM. The values of the items in a Preset can be set in service.
White tone:	Pre-defined values for the white point RED, GREEN and BLUE settings. The values of the white point settings for each white tine setting can be set in service.
Hue:	Tint
First/last program:	0-99 for 100 programs available.
Available program:	First available program is the lowest program number in NVM that is marked as *not skipped*. When all programs are skipped then the lowest program number is used. Last available program is the highest program number in NVM, which is

	marked as *not skipped*. When all program numbers are skipped then the highest program number is used.
Program number:	A program number identifies a location in NVM. At this location all program information, like frequency, lock, AFC, etc., can be found. Selecting a program invokes activating the program information.
Last status:	A variable can be classified as 'last status' setting. Settings that are classified as 'last status' are stored in NVM. The following settings are part of the last status: • Program number • Volume • Audio Preset • Video Preset • Aspect ratio
WSS:	Wide Screen Signalling
Letterbox:	When a 14:9 or 16:9 format movie or picture on 4:3 transmission displayed on 4:3 set, black bars on top and the bottom of the screen are displayed. This is called letterbox or 4:3 letterbox.